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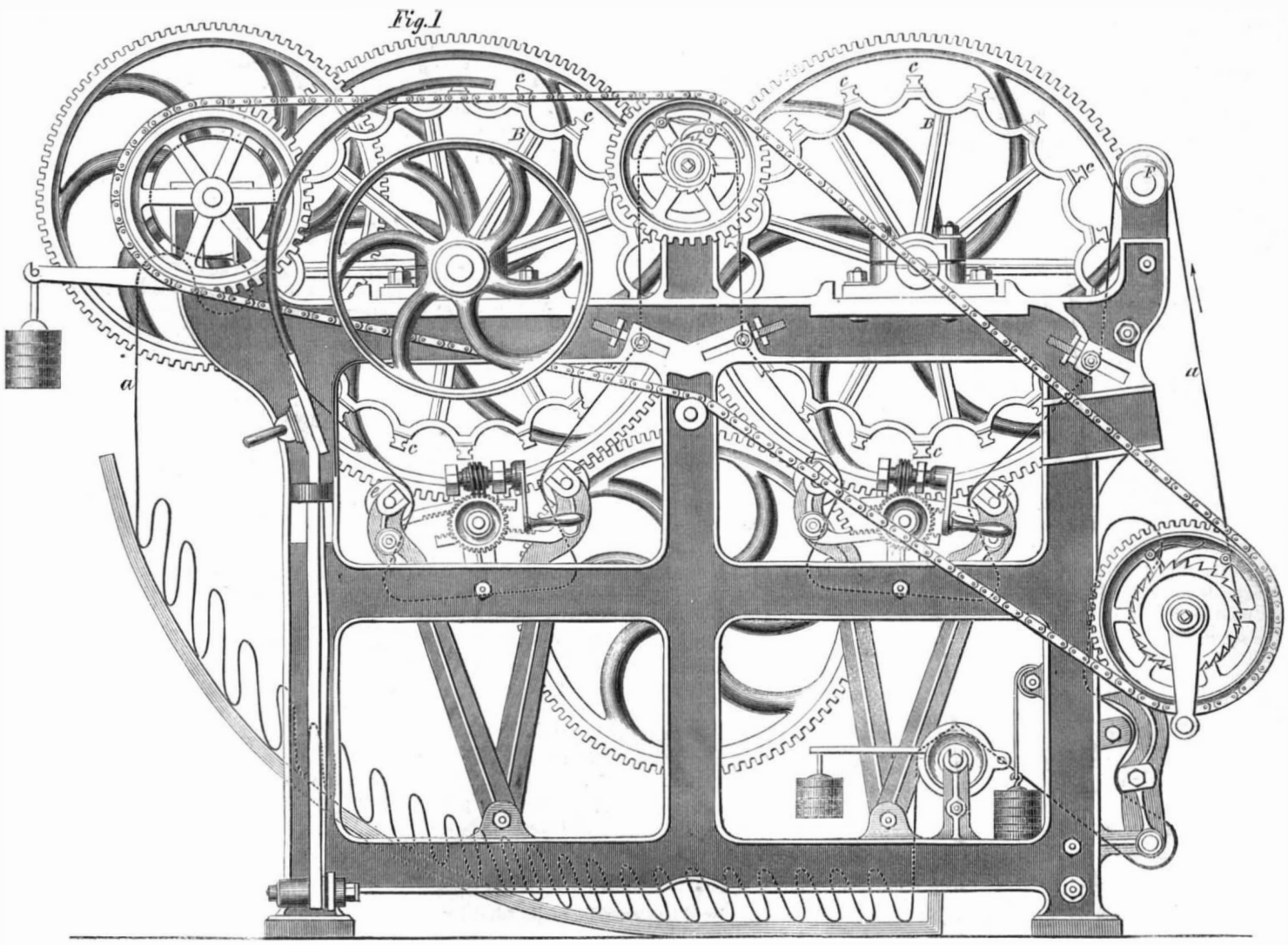
GESSNER'S GIG MILL.

Fig. 1



Raising the Nap.

"The more I think of it," says Teufelsdroch, "it astonishes me the more, society is founded on cloth." As human nature is constituted, men are judged to a large extent by the surface which they present to the world; and among civilized nations the surface which the male portion of the community, after trying all known materials, prefer to exhibit is formed of a soft nap of sheep's wool. It would seem therefore that the mode in which this nap is formed must be a matter of universal interest. It is the purpose of this article to describe the process.

The nap on woolen cloth is formed by catching soft elastic hooks into the fabric and tearing them out; breaking a portion of the fibers and turning their ends outward. The hook most suitable for the purpose is found upon the seed vessels of a certain plant which is designated by botanists as the *Dipsacus fullanum*, but which is known among agriculturists and manufacturers as the teasel. The inflorescence of this plant is whorled, forming a head or bur, and the scales of the receptacle terminate in a small, elastic, horny hook of precisely the character required for raising the nap or pile on woolen cloth. The teasel heads are of conical form two or three inches in length, and an inch to an inch and a half in diameter at the lower or larger end. They are fastened to the surface of revolving cylinders, and the piece of cloth is drawn along as the cylinder revolves so as to expose all parts of the surface to the action of the teasels. The action is repeated several times to complete the nap, partially worn teasels being first used, and the process being finished by those that are new. The machine employed for teaseling cloth is called a gig mill, and the accompanying engravings illustrate one of these mills of improved construction invented by Ernst Gessner, of Aue, near Schneeberg in the Kingdom of Saxony. This gig has been used several years by the principal manufacturers of woolen cloth in Germany and other parts of Europe, and has been recently introduced into this country; in all places giving the most perfect satisfaction as is shown by certificates of the highest character.

Fig. 2

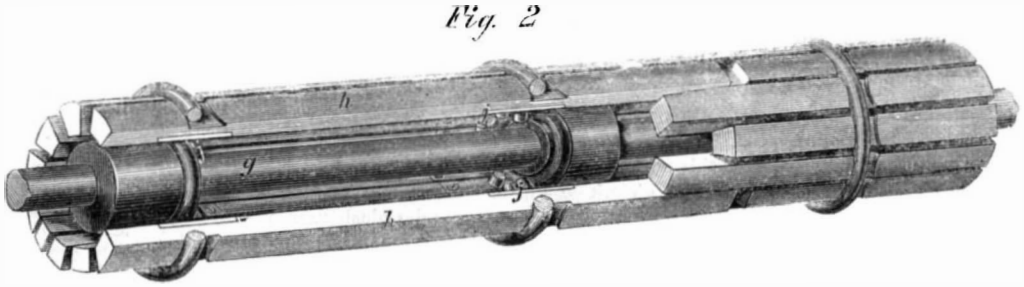


Fig. 1, is an end view of the machine. The course of the cloth is indicated by the line, *a*. Several pieces of cloth are sewed together end to end so as to form an endless belt, and then they are run through the machine a sufficient number of times to raise the nap; thus saving the labor of repeated introductions of the piece into the machine. The teasels are fastened to metal bars which are secured to the peripheries of the cylin-

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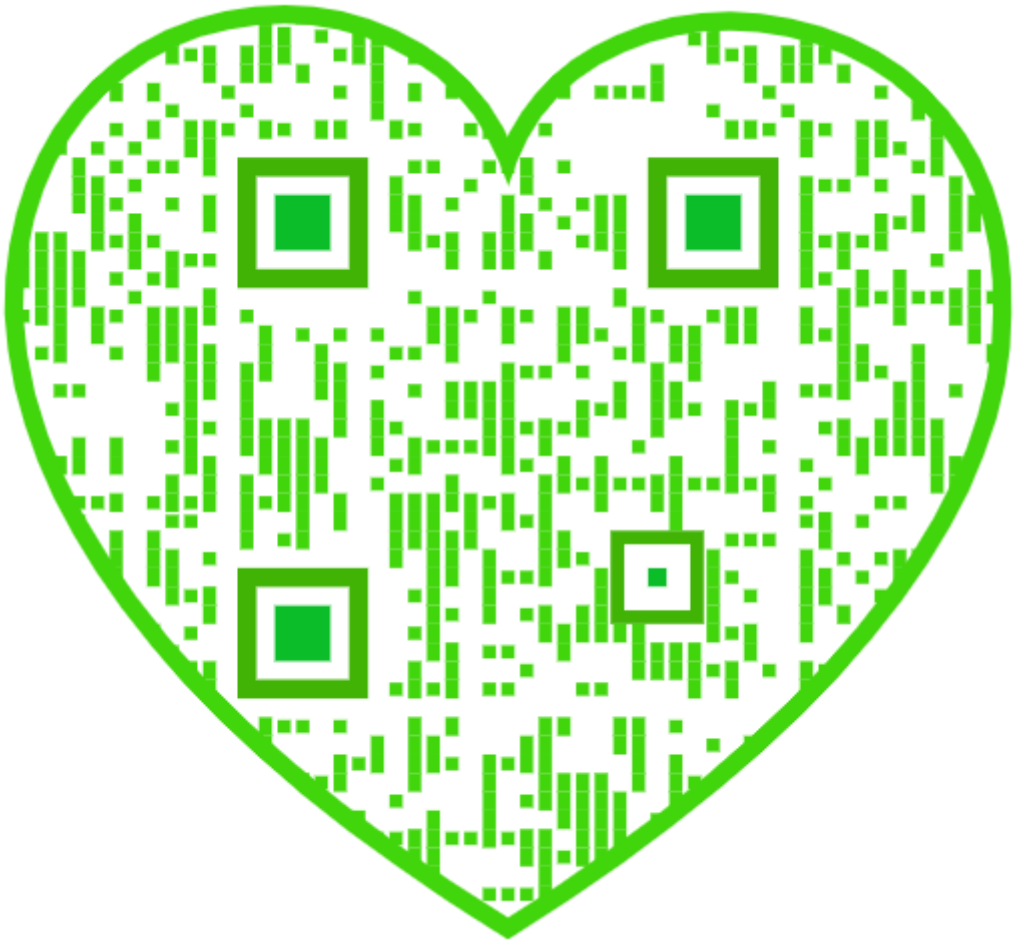

ders, B B, at the points, *c c c*. The cloth passes into the machine in the direction indicated by the arrow, and it is pressed against the teasel cylinders by the rollers which surround them in such manner that it is brought in contact with the surface of each cylinder at four parts of its periphery, thus being subjected to the action of the teasels eight times in its passage through the machine.

The rollers, *d d*, and *e e*, which press the cloth against the teasel cylinders, are so supported that their positions may be varied to press the cloth more or less firmly against the teasels. To this end the journals of these rollers rest in a V-shaped frame pivoted at the apex so that the distance apart of the rollers may be varied at will by means of a rack on each limb of the frame meshing into a pinion which is geared to a worm screw, as shown.

In order to present a perfectly plain surface to the action of the teasels, it is necessary to subject the cloth to tension laterally as well as lengthwise and the novel and ingenious device by which this is effected is illustrated in Fig. 2. The roller, F, Fig. 1, over which the cloth passes before it first comes in contact with the teasel cylinder, B, is formed as shown in perspective in Fig. 2. The central core, *g*, is stationary, and the sheath of slats, *h h*, is caused to revolve around it by the cloth operating as a belt. The engraving represents a portion of the slats removed to show the central core or cylinder. This cylinder is surrounded by rings, *i i*, secured rigidly to its surface, not at right angles to its axis but at an inclination of some 70° and each slat has pins, *j j*, projecting from its inner side and resting against the sides of the rings, *i i*. Hence when the sheath of slats revolves around the stationary cylinder, the slats, besides their revolving motion, receive a reciprocating motion back and forth along the cylinder in a direction parallel with its axis. The slats are formed in two sets, one upon each end of the cylinder, and the cylinder is so adjusted upon the machine that the slats may be moving apart endwise on that side of the roller on which the cloth bears, and returning to their position more closely together on the opposite side. In other words the surface of the roller is constantly stretching lengthwise on that side of the cylinder which is in contact with the cloth, and contracting in length on the opposite side. It is plain that this action operates to extend the cloth sideways or increase its breadth. The slats are held upon the roller by elastic india-rubber bands.

A considerable number of these gigs have been sold in this country. The price is $700 and the inventor claims that a machine for narrow goods will pay for itself in one year, and a machine for broad cloths in from one and a half to two years. He says that a machine for narrow goods will do as much work as six machines of the old style, and a machine for broad goods three and a half times as much as the old style gig. He also says that this gig makes better work with a saving of room, power and teasels. Certificates from the principal manufacturers of woolen cloths in this country as well as in Europe seem fully to sustain these claims.

The American agent for these gigs is Henry Kayser, who may be addressed at the Union Steam Works, corner of Second avenue and Twenty-second street, New York; where the machines are manufactured.

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE BATTLES OF JUNE 26TH AND 27TH BEFORE RICHMOND.

Two of the severest fights that have yet taken place occurred in the neighborhood of Richmond on Thursday the 26th and Friday the 27th of June. They accompanied—either accidentally or with forethought on the part of the enemy—a change in the position of our army, and a few words in relation to this position will make all the operations intelligible.

Richmond, the old and beautiful capital of the State of Virginia, and at present the capital of the so-called Confederate States, is situated on the north bank of James River, a navigable stream which flows in a southeasterly direction, and empties into the mouth of Chesepeake Bay. At the distance of some 20 or 30 miles to the north east of James River is York River, flowing also southeasterly and emptying into Chesapeake Bay. Nearly midway between these two rivers is a much smaller stream, the Chickahominy, running in the same direction as the other two, but about 40 miles below Richmond turning South and emptying into James River.

In the spring Gen. McClellan landed his army at the southeast end of the peninsula, or strip of land lying between the James and York rivers, and marched up toward Richmond, driving the enemy before him. He kept on the northeast side of the Chickahominy till he arrived within 8 or 10 miles of Richmond, when he threw a portion of his army across that stream. When he had got one division (Gen. Casey's) across, the enemy thought that they could overwhelm that division before the rest of the army could come to its rescue; the Chickahominy flowing at this place through a broad swamp and being crossed by only a few bridges. The attack was made with all of the enemy's force on the 31st of May and 1st of June, but our great superiority in artillery, combined with the steady valor of our troops, enabled Gen. Casey to maintain his position until reinforcements were sent to his aid, and the attack was repulsed.

Since that bloody battle, the principal portion of the army has been moved across the Chickahominy, and sometime since Gen. McClellan intimated an intention to take the remainder across, and abandon the ground on the north side of the Chickahominy altogether. In this case he would have to receive his supplies by the way of James River instead of the York as heretofore. Immense stores of ammunition and supplies had been carried up York River, and up one of its Southern branches, the Pamunkey, and landed at White House, from which place a railroad led right into McClellan's camp.

On Tuesday the 24th of June, McClellan ordered the stores at White House to be reshipped on board the transports, of which some 700 of all sizes were lying in the Pamunkey, ready to be sent round up James River, to the new base of operations.

While this operation was in progress, the enemy, either wishing to take advantage of it, or else moving at the same time by a strange coincidence, marched out of their camp before Richmond in great force, crossed the Chickahominy above or at the west of our army, and attacked the portion of our forces still remaining at the north of the stream. These forces consisted of one corps only, that of General Fitz John Porter, comprising the divisions of McCall, Morrill and Sykes. General McCall's division was stationed at the extreme right and of course received the first attack. The attack was fully anticipated, and our men were all ready to receive it. The first Pennsylvania Rifles were on picket duty in the advance, and at about two o'clock in the afternoon of Thursday, June 26th, they found themselves suddenly enveloped by hosts of the enemy. They cut their way back to the army with the exception of company K, which was nearly all captured. McCall drew his men boldly out in the open field, and awaited the attack which was delivered by the enemy with not less boldness. At about six o'clock General McCall was reinforced by General Morrill's division, and the fight continued to rage till half past nine at night. It was one of the longest and fiercest battles that has yet occurred. General Porter and General McClellan were both on the field, and they saw our volunteers display the firm courage of veteran troops. It was the business of our troops simply to hold their position, which they stubbornly did till darkness put an end to the contest.

General McClellan gave orders that early the next morning the right wing should draw back toward the crossing of the Chickahominy, in accordance with the prearranged programme; his plans apparently not being diverted nor even checked by this furious onslaught of the enemy. His order directed that the corps should march to a certain position near Dr. Gains's mill, about six miles to the east, then not to yield this position on any condition.

At three o'clock in the morning of Friday, June 27th, the army took up its slow and orderly march to its designated position, which it reached at about 11 o'clock, A. M., fighting the pursuing enemy all the way. Arrived at the ground, the arms were stacked and the men threw themselves down to rest, many of them getting a short nap, a most valuable preparation for the terrible struggle that was yet to come.

The field of battle is a large one. Like Virginia land of similar area in this vicinity, it is made up diversely of level meadows, undulating grain fields, woods, thick with underbrush and clear of it, and marshes and ravines. There are three large farm houses, each in sight of the other, each on a shaded hill, and each got up in the inevitable Virginia style of huge outdoor chimneys at either end. These were first used as headquarters by Generals Porter, McCall and Morrill, but afterward converted into hospitals. The open country, longitudinal in shape, is enveloped with woods.

By 11 A. M. each division and brigade, and regiment and gun was in its place. Some were in the broad, open field, and some under cover of the woods and hillsides. The whole presented an animated spectacle—the glorious Stars and Stripes floating in every direction; bright howitzers and bayonets glistening in the sunlight; batteries in readiness for action; cavalry companies eager for dashing charges; generals and their staffs in full uniform on their caparisoned horses, unmindful of the dangerous targets for the enemy's rifles their showy uniforms and equine decorations made them, and regiments of infantry with their arms stacked to be grasped and used at a moment's notice. It was intensely hot. If men suffered then, what must they have suffered when the contest for life and victory waxed hot and hotter a short time afterward, and when to the discomforts of heat were added those of dust and smoke?

A full hour was thus passed before the enemy made his appearance. At about noon the attack commenced, and again through all the afternoon and till half-past nine at night, these thousands of Americans were busy in the awful labor of slaughtering each other. During the battle reinforcements were sent for, and General Slocum's division, with Genera's Palmer, French and Meagher's brigades, recrossed the Chickahominy to the aid of our troops. As on the evening before, night put an end to the contest, with our soldiers all in the positions to which they had been assigned.

In the meantime, the other portions of McClellan's great operation of changing his base had been moving foward with energy and regularity. Gen. Casey superintended the shipment of the stores at White House, on board of the immense fleet prepared to receive them, and as fast as a squadron was laden, it was taken in tow by a steamer and moved down the river. A large number of the runaway slaves of rebel owners were employed in this labor of shipping the stores, and Gen. Casey assured them that not one should be left behind to the vengeance of their masters. The shipment was guarded by gunboats and by a squadron of cavalry detailed for the purpose. The last of the transports was loaded at about 4 o'clock Saturday afternoon, and moved down the stream; a quantity of damaged hay and other worthless matter being set on fire. Nothing of any value, and not even a contraband was left behind. The protecting cavalry moved off to join Stoneman's division to which they belonged, and at about 7 o'clock in the evening the enemy made his appearance, but did not find the rich stores to capture which is supposed to have been the object of his two bloody but bootless battles.

A paymaster, who came from headquarters on Saturday, says that the last of our troops crossed the Chickahominy on Friday night, thus bringing to a successful conclusion the great movement of changing the base of operations.

EVACUATION OF JAMES ISLAND.

The engagement on James Island, near Charleston, mentioned by us some time since, proves to have been a decided and bloody repulse of our forces from an attack which they made on the enemy's intrenchments. General Benham, who led the attack, has been sent home by General Hunter, and the island has been evacuated; thus abandoning for the present the attack on Charleston.

VICKSBURG BOMBARDED.

The whole of the Mississippi River is now in our possession, with the exception of about four miles opposite the city of Vicksburg, in Mississippi. Commodore Davis has descended the stream to a point just above the city, and Commodore Farragut is just below with his fleet, including the bomb flotilla. The two commanders are in communication, and we have reports that the bombardment has commenced.

MORE TROOPS CALLED OUT.

The governors of eighteen States addressed a com-

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munication to President Lincoln on the 28th of June, urging him to call out enough troops at once to end the war, and the President has replied, acceding to the request and calling out 300,000 additional soldiers.

The French Merchant Navy.

The head of a large commercial house at Havre has addressed the following letter to the *Avenir Commercial*, which explains some of the causes of the inferiority of the French Merchant Navy as compared with that of other countries :—

The inquiry respecting the merchant navy, of which you have inserted the programme in your estimable journal, appears to me to be destined to experience a great delay in its conclusions in consequence of the too great number of objects it embraces. Permit me, without waiting for the result, to communicate to you my personal knowledge on the subject. It will explain to you the cause of the inferiority of our merchant navy as compared with that of foreigners. We do not possess in France the timber and the masts necessary for building ships of a heavy tunnage, and we must, consequently, import both at a great expense from foreign countries—either from England or from the American States. I purchased in America at the close of December last a ship then on the stocks, which was declared French by the French Consul after she was launched in January last, having first received the name of *Prince Imperial*. She was sold to me, as is the custom in the United States, according to the builder's measurement, as a vessel of 950 tuns, at so many dollars a tun. Being sold according to that calculation, it was the builder's interest to increase rather than diminish the tunnage. Having been launched, and measured by the American customs, the official measurement was declared to be 898 tuns, but on its arrival at Havre the French official tunnage was raised to 1,002 tuns, being 104 tuns more than that of the American customs, and 52 tuns more than that of the builder. I had, therefore, to pay for the making her French at the rate of 25f. the tun on 104 tuns extra, amounting to 2,600f. which was a dead loss to me. Two ships of the same build—the one American and the other French—will not be on an equal footing. The American coming to France will pay customs and other dues which are calculated at so much a tun on its official tunnage of 898 tuns, while the French ship going to the United States will pay so much a tun on 1,002 tuns. This will make a difference of some thousand francs against the French flag every time it enters an American port, solely through the fault of the French custom house. And, moreover, I must in France pay all the dues and other expenses, calculated at so much a tun, on a tunnage of 1,002 tuns, while my American competitor will pay off only 898 tuns. The *Prince Imperial* had, when she arrived at Havre, furniture, linen, china and glass barely sufficient for the use of the officers. The customs found means to make me pay a duty of 15 per cent on these articles, which form part of the ship, are never to quit it, and are as indepensable to the officers as the sails are to the ship. Is that just? The captains and shipowners ought to be the only competent judges of what is necessary for the safety of the crew and of the ship. All that is useless takes up the place of freight, and is a loss to the shipowner. Let the Government free us from the impediments and extra expenses which its administration imposes on our shipping, and it will double their number. The administration in America imposes no impediment on its shipping, and it owes its great extension to that fact. Notwithstanding the extensive trade we carry on in time of peace with the United States, both in imports and exports, in raw and manufactured articles, we do not possess a single ship in France which, by its construction, can compete with their ships for the conveyance of their produce, such as cotton, tobacco, corn, &c. I conceived the first idea of being the pioneer; but I cannot continue to be so except at a loss. I proved by the name I gave my ship that I am not a railer. I desire to enlighten the Government as to the causes of our maritime inferiority, and that in its inquiry it may seek for information from competent persons, such as shipbrokers, captains and shipowners.

A Giffard's injector is now used at the Pewabec copper mine, Lake Superior.

New System of Iron Steamship Building.

A new system of constructing iron screw steamers to obtain lighter draft and increased speed, was lately described before the United Service Institution, London, by Capt. Simmonds, a joint inventor with Wm. Roberts, engineer, Manchester. It consists in using cellular beams or girders along and across the deck and at the bottom; and, to avoid the waste of space which this plan would otherwise occasion, the spaces of the cells are to be used as cabins, stables (in troop ships), and coal bunkers. By the adoption of this system of construction it is expected that much greater stability will be given to that part of steamships which requires it most, but which, according to the usual mode of construction, is generally the weakest. The form of ships is also proposed to be altered by making them much broader and more flat bottomed, by which means the draft will be greatly diminished; and to avoid the inconvenience which such a form might occasion, it is proposed to have two cellular keels, by which means ships so constructed would make quite as little leeway as those that are much deeper in the water with a single keel, and they would be stronger and more steady in a rough sea. For propelling such vessels two small screws are to be employed, fixed to parallel shafts near the bottom, the shafts being turned with increased velocity by gearing, and the blades of the screws being so placed as to produce forward motion when turning in different directions. There are to be four engines, situated as close as possible to the bottom of the ship. By these arrangements it is expected that the propellers will be less liable to foul, that they will be less exposed to injury from accidents or from shot, and that, by having two independent means of propulsion, if either of them should be disabled, the ship might still be propelled, though at a slower rate. To facilitate the steerage there are to be two rudders fixed below the screws, the whole of the "dead wood" being removed, and the action of the two propellers may also be brought to bear in steering; therefore, Captain Simonds anticipates that a large ship may be turned round within its own length.

To Make Stilton Cheese.

As the time is at hand for making cheese, the following method, described in "Morton's (British) Cyclopedia," for making the celebrated Stilton English cheese, may be useful to a large number of our readers :—

The night's milk is set aside to cream, and in the morning it is skimmed, and the cream added to the new milk. The whole is now made of a proper temperature (84°) and the rennet then added. The curd should be fully formed in one hour and a half; if formed more quickly it will be poor and tough; and if much longer it requires to be warmed, which is also injurious. The curd is not broken up in the common way, but is carefully removed in slices by the skimming dish, and placed upon a canvas strainer or sieve. When the curd has been placed on the strainer, the ends are tied up, and the whey pressed out by gently twisting round the whole mass—the ends being stationary, and suspended on a stick laid across the cheese tub. It is allowed to drain until next morning, unless the weather is very warm, when the curd should be removed from the strainer, and placed in a clean dish in a cool place, where it is cut into thin slices, and put into a hoop made of tin, perforated with holes, and rather larger than the intended cheese. A clean strainer or cloth is put between the hoop and curd; and, as the slices of curd are laid in, a small quantity of salt is sprinkled between every second or third layer. The hoop containing the curd rests on a clean cloth, and is covered with another, but no weight is applied to extract the whey. Next morning the curd is taken out of the hoop, clean strainers and cloths are employed; it is then inverted and placed in the hoop as before, and afterward pricked with iron skewers in the sides, to facilitate the extraction of the whey, and drying of the curd. These processes are repeated for four or five successive mornings, until the curd becomes firm. During this consolidating process, the cheeses are kept in a warm place, and in cold weather they are set in tins before the fire, or in heated ovens constructed for this purpose. It is necessary for the perfect extraction of the whey, that the drying temperature be raised to about 100°. The utmost cleanliness and care are indispensable during the whole process. The whey should have a free run from the curd, and the strainers should be washed and then dried thoroughly in the open air, every time they are taken from the curd.

When the cheese has become sufficiently firm, it is pared and smoothed. The inequalities in the sides where the slices join, are filled up by parings from the projecting parts, and the top and bottom are also smoothed by paring with the knife, and lying alternately on a flat board. A strong fillet of canvas, long enough to encircle the cheese two or three times, is then firmly bound round it, and held tightly by strong pins; a clean, dry cloth is also placed under and above it. The binder and cloths are removed every morning, and all cracks filled up. These operations are continued until the outside becomes hard and wrinkled, or coated, as it is termed. After this, the cheeses are removed to the drying room, where they are regularly turned and cleared from the mites. In warm weather the flies are apt to attack cracks or soft parts of the cheeses; and when this occurs, the best plan is to scoop out the affected part, fill it up again with the soft part of another cheese kept for the purpose, and cover carefully with cloths.

The same method is pursued in making Cheshire and Gloucester cheese. One gallon of milk is allowed for one pound of cheese.

Railroad Building in Pennsylvania.

Something amounting almost to a railroad mania now exists in Pennslyvania. Several new railroads are being constructed, and several established companies are constructing new branch lines. The Atlantic and Great Western is in rapid progress; the Pittsburgh and Erie, intersecting the above-named line at Jamestown, is progressing; and so are the Jamestown and Franklin, under control of the Pennsylvania Railroad Company, to connect with the Sunbury and Erie; also the Corey and Titusville, penetrating the oil region. These railroads, when completed, will develope the great mineral resources of the Northwestern part of Pennsylvania. The Tyrone and Lock Haven Railroad, uniting the Pennsylvania Central with the Sunbury and Erie, it is said, will be finished between those points by the 1st of August, and soon after between Lock Haven and Bellefonte. The Pennsylvania Central is pushing forward branch lines in several directions. One runs from Lewistown through Penn's Valley to Bellefonte; another extends to Ebensburg, and a third to Bedford by the Broad Top Line. In the Eastern part of the State the East Mahanoy Railroad has just been finished, while the Reading and Columbia line is being pushed rapidly to completion.

The great pier at Hilton Head, South Carolina, now completed, is upwards of 1,400 feet in length the width being 40 feet, and the head some times called the T, being 140 feet long. The workmanship throughout is of the most solid kind. To sustain it more than one thousand pine trees have been cut down, their trunks drawn from three to four miles, and driven far down into the sand.

Iron Sleepers.—Iron sleeper's have been laid down on the Madras (Indian) Railroad in place of wooden sleepers. It has been found that wooden sleepers decay so rapidly in tropical climates, that iron has been resorted to as a more economical material. This railroad is 406 miles in length, and stretches across the Indian Peninsula from Madras to Beypoor.

Among the locomotive tires shown at the Great Exhibition in London, is a pair from the North London railway, which have run 78, 000 miles without repair, and another set which have made 66,000 miles. Both are of steel, from the works of H. Krupp in Prussia.

At the Great Exhibition, as a specimen of fine type and printing, there is a copy of the entire New Testament printed upon a single sheet of paper. It was printed by Collins, of Glasgow, the celebrated publisher of rare books and beautiful editions of the classics. Although so small the type is stated to be very clear.

The British iron-clad frigate *Warrior*, has lately made another trip to sea, and it is stated, did not sail so well as on her first voyage.

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PETROLEUM—OIL WELLS OF SMITH'S FERRY—ALLEGHANY OIL BOATS.

Number I.

A new branch of national industry has sprung up within the past two years, which promises to become both great and profitable—we mean that of our native petroleum, or rock oil. The export trade in this substance has already attained to vast dimensions. From the first of January last to the 23d of June, no less than 2,961,317 gallons were exported from New York; 1,095,826 from Philadelphia; 190,512 from Boston, and 36,530 from Baltimore, making a total of 4,284,185 gallons. These native oils were forwarded to almost every country on the face of the globe, but England is our best single customer, as about two million of gallons were sent to British ports. One merchant in Liverpool, who has imported largely, states that Great Britain alone can absorb one million barrels (42,000,000 gallons) per annum. When we reflect that this business is but in its infancy, the large quantity which has already been exported is perfectly surprising It is believed that the United States and Canada possess natural supplies of petroleum to furnish the rest of the world for ages to come, with sufficient quantities of oil to yield all the artificial light required, and perhaps much of the fuel also—as it can, and will, undoubtedly, yet be much used for the latter purpose.

The petroleum region embraces a vast extent of our continent. It is known to extend from the southern extremity of the Ohio valley north to the Georgian Bay in Canada West, and from the Alleghanies east in Pennsylvania to the western limits of the bituminous coal fields. It has been found in Virginia, Maryland, Pennsylvania, New York, Ohio, Michigan, Kentucky, Tennessee, Kansas, Illinois, Texas, and in California. Oil wells, however, have been sunk in but a few localities as yet, and in some of these, the original wells have been abandoned on account of new and more copious supplies being obtained at less expense in other sections. In proceeding up the banks of the Ohio river, a derrick about twelve feet in hight, and a small shanty beside it, with a rusty stove pipe stuck in its roof, is occasionally noticed. These are deserted pumping oil wells, and at Smith's Ferry, about forty-one miles below Pittsburgh, there is a whole cluster of such wells, all stopped but two. The pumping apparatus of each is very simple. It consists of a small horizontal engine connected by its pitman to a crank, which gives motion to a vibrating wooden beam, one end of which is attached to the vertical pump rod in the well, which thereby receives a reciprocating motion that operates the pump plunger and lifts the oil. A rude derrick, a rough shanty, a small steam engine, a pump, a few barrels and tubs, constitute the apparatus and utensils required for operating any of these oil wells. Such wells may be seen on both sides of the Ohio and Alleghany rivers, and occasionally on some of the little islands. They were mostly sunk before the flowing deep petroleum wells in the Oil Creek region, Pa., were discovered. Bore anywhere adjacent to the Ohio river for a few hundred feet, and earth oil is reached. We have noticed a coat of this oil covering the surface of the river for a distance of seventy miles. When the sunbeams shine upon the ripples it reflects the prismatic hues in beautiful green, crimson and orange. It no doubt assists to lubricate the bottoms of the quaint looking flat boats which run on the Alleghany, Monongahela and the Ohio rivers. The pumping wells are generally suspended at present because the oil cannot be raised from them by steam power so cheaply as it can be obtained from flowing wells. But the oil obtained from the pumping wells at Smith's Ferry is of no common quality. It is almost as clear as refined petroleum, and it can be burned in lamps exactly as it is raised from the well. We have seen a mixture of one half of this oil and an equal quantity of crude petroleum burn very well in a lamp. It resembled common whale oil. It is heavier than the refined petroleum, and is safe to carry and use. Only a few barrels per day, however, are obtained from single wells, or perhaps they might be operated with profit.

The petroleum wharf at Pittsburgh on the Alleghany river, is a greasy sight of an uncommon character. It is covered for half a mile with barrels of petroleum that have come down the river in boats from the Oil Creek region. A large number of flat boats are also generally lying at the wharf, some of which are discharging their green oily cargoes. These vessels are queer looking structures, being simply large boxes made of plank, and divided into cells forming tanks, which are made as tight as practicable. They are filled at the oil wells, then closed, and about from twelve to twenty of them are formed into a fleet and floated down the Alleghany river. Some boats carry the petroleum in barrels, but a large number are simply floating oil boxes. This part of Pittsburgh is redolent with the exquisite odor of Pennsylvanian subterranean Eue de Cologne. Refined petroleum may be obtained in Pittsburgh in large quantities for sixteen cents and upward per gallon. This burning fluid affords the cheapest known artificial light, and its use has spread from Maine to California, and it is now almost exclusively burned away up in the Lake Superior regions. While it can be obtained at such low prices it will be used as an agent of artificial illumination to the exclusion of all the more expensive agents of light, with the exception of coal gas.

VALUABLE RECEIPTS.

Black Japanning.—Black grounds for japans may be made by mixing ivory black with shellac varnish, or for coarse work, lamp black and the top coating of common seedlac varnish. A common black japan may be made by painting a piece of work with drying oil and putting said work into an oven not too hot, then gradually raising the heat and keeping it up for a long time, so as not to burn the oil and make it blister.

Tortoise Shell Japan.—This varnish is prepared by taking of good linseed oil one gallon and of umber half a pound, and boiling them together until the oil becomes very brown and thick, when they are strained through a cloth and boiled again until the composition is about the consistence of pitch, when it is fit for use. Having prepared this varnish, clean well the vessel that is to be varnished (japanned) and then lay vermilion mixed with shellac varnish, or with drying oil diluted with good turpentine, very thinly on the places intended to imitate the clear parts of the tortoise shell. When the vermilion is dry brush over the whole with the above umber varnish diluted to a due consistence with turpentine, and when it is set and firm, it must be put into an oven and undergo a strong heat for a long time. This is the ground for those beautiful tea boards which are so much admired. The work is all the better to be finished in an annealing oven.

Painting Japan Work.—The colors to be painted are tempered generally in oil, which should have at least one fourth of its weight of gum sanderac or mastic dissolved in it, and it should be well diluted with turpentine, that the colors may be laid on thin and evenly. In some instances it does well to put on water colors or grounds of gold, which a skillful hand can do and manage so as to make the work appear as if it were embossed. These water colors are best prepared by means of isinglass size mixed with honey or sugar candy. These colors when laid on must receive a number of upper coats of the varnish above described.

Cement for Joints of Petroleum Stills.—Take 6 lbs. graphite (black lead), 3 lbs. of dry slacked lime, 8 lbs. of the sulphate of barytes and 3 lbs. of boiled linseed oil, and mix them thoroughly together. The solid materials must be reduced to fine powder before being stirred among the linseed oil. If the above quantity of oil is not sufficient for making the cement sufficiently thin add more until the proper consistency is obtained.

Linseed meal cake reduced to powder and mixed with water so as to make it into a paste makes a good lute for stills which are not subjected to a temperature above 260° Fah.

To Cure White Sheep Skins with the Wool on.—First soak sheep skins in cold water to soften them, then place them on an inclined board, scrape all the fleshy parts from the inside and trim the edges with a knife. After this rinse them in cold water, then wash them in strong soap suds and rinse them again in water. While still wet they are to be steeped for about six hours in a strong solution of alum, then dripped and stretched on frames, and dried in the open air, but not exposed to the sun. Some persons sprinkle alum in powder over the fleshy side of the skins instead of soaking them in the alum liquor.

Cement for Leaky House Roofs.—Take four pounds of rosin, one pint of linseed oil, two ounces of red lead, and stir in pulverized sand until the proper consistency is secured, and apply it warm. This cement becomes hard and yet possesses considerable elasticity and it is durable and water proof.

Clear Gutta Percha Solution.—Cut gutta percha into thin strips and put it in a glass bottle, and add as much chloroform as makes a thick paste. This paste is then placed in very hot water, and kneaded with the fingers. After considerable manipulation the gutta percha loses much of its color, and if this process is repeated, becomes very nearly colorless, having only a pale straw tint. A chloroform solution may then be made of any strength, which is useful for many purposes—when thin, as a substitute for court plaster, and when thick, as a stopping for decayed teeth.

To Remove Resin Spots from Silk.—Many silk dresses receive stains from turpentine being spilt upon them. These stains are due to the resin which is held in solution by the turpentine, and which remains in the silk after the volatile or spirituous portion has evaporated. Alcohol applied to the stains with a clean sponge will remove the spots, because alcohol dissolves the resin. The silk stains should be moistened with the alcohol first, and allowed to remain soaked for a few minutes. Fresh alcohol is then applied with the sponge, and with a slight rubbing motion. It is then wiped as dry as possible and afterward permitted to dry perfectly in the open air. Alcohol also removes grease and oil spots from silk and woolen dresses, but oil generally leaves a yellow stain behind. A mixture of alcohol and the refined light petroleum, called benzone, is excellent for cleaning light kid gloves, ribbons and silks. It is applied with a clean sponge. Persons who apply these liquids and mixtures to cleaning silks, gloves, &c., must be careful to do so in an apartment where there is neither fire nor lamp burning, under the penalty of an explosion.

Packing Fruits for Long Distances.

A correspondent of the *Cottage Gardner* describes the following method for packing fresh fruits of various kinds. This system he has practiced with success for twenty years, and he has sent fruit from distances varying from fifty to five hundred miles :—

Take a box, soft paper and sweet bran. A box is chosen in size according to the quantity to be sent. A layer of bran is put on the bottom, then each bunch of grapes is held by the hand over a sheet of paper; the four corners of the paper are brought up to the stalk and nicely secured; then laid on its side in the box, and so on until the first layer is finished. Then, fill the whole over with bran, and give the box a gentle shake as you proceed. Begin the second layer as the first, and so on until the box is completed. Thus with neat hands the bloom is preserved, and may be sent to any distance; but with clumsy hands, quite the contrary, and often an entire failure, as the putting and taking out of the box are the most important points to be observed. I have invariably packed sixty or eighty bunches of grapes, and fifty or sixty dozens of peaches or apricots in one box, and received letters from persons who said they had arrived as safe as if they had been taken from the trees that morning.

A Railroad Car Built in one Day.

An English paper states that a railway car was built complete, filled with goods for the great Exhibition, and conveyed from Manchester to London in twenty-four hours. This feat was performed at the works of Mr. Ashbury, Manchester, and several distinguished persons were present to witness the operations. At 7 o'clock, A. M., the iron to be used was in the pig and the timber in logs. In 43 minutes the latter was cut. The planing, mortising, &c., was finished a few minutes after 10 o'clock, when the smiths began. Their work ended at 2.45 P. M. At one o'clock the wrought-iron work, such as axles, tires, &c., was done, and at 6.16 P. M., this had left the planing shop finished. The car was completed at 6.35 P. M., and half an hour subsequently it started for the great metropolis with a load of articles for the Exhibition.

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THE LONDON TIMES AND AMERICAN EXHIBITORS—AN INTERESTING SUMMARY.

From causes on which there is no necessity now to dwell, our kinsmen across the Atlantic are very imperfectly represented at the International Congress. From the Southern States, of course, there was nothing to be expected, and if the matter had rested with the Washington Government there would not have been a single contribution from the Northern States. Private energy and enterprise, of which the chief merit is due to Mr. Joseph E. Holmes, the Commissioner, have to some extent supplied the deficiency, and, though we are left almost entirely in the dark as to the state of arts and manufactures in the States, the south-eastern corner of the building, at the end of the east transept, contains a numerous and exceedingly interesting collection of various contrivances for simplifying and facilitating the operations of ordinary trades. There is nothing particularly startling or imposing in the display, though occasionally the cleverness with which difficulties are overcome or some useful and all-important result obtained by the simplest means approaches almost to an inspiration of genius; but as nearly all the articles appear to have been selected because they were easy of transport, perhaps we are not wrong in accepting them as the representatives of much more important pieces which would have been sent here under a happier state of things.

The chief merit of Straker's washing machine, which stands close by the south-eastern entrance, appears to be the ease with which it deals with large heavy pieces, such as blankets and counterpanes. For hotels, hospitals and such places it must be very valuable. Conroy's cork cutters, which stands next, are very neat in their operation. The man in charge simply puts down a square of cork on a small ledge, and as the machine works two fingers are pushed out, which grasp it, and fix it on a rapidly-rotating pin, where it is applied to the edge of a circular knife, revolving horizontally, and in a couple of seconds the square assumes the desired shape and size, and immediately drops into a reservoir beneath to make room for another. A man and a couple of boys can cut 150 gross of corks with this machine in a day. The rope-making machine, which stands next, compresses a rope walk of some 800 or 900 yards into about 8 feet, and it spins a 12-strand rope quite as stout and in much less time than it could be done by hand. To machinists we would point out a very simple contrivance, which they will find on the wall close by the rope-spinner, for shifting and securing machinery belts, by which, no doubt, many accidents may be prevented. By pulling a cord the belt is moved either on or off the drums, and as the guides move they are secured in their place by a self-acting lock, so that the belt cannot slip either one way or other. Eckel, of New York, sends one of his new presses, by which 1,000 lbs. of cotton may be pressed into 18 cubic feet, or 800 lbs. of hay into a truss of 5 feet by 2 feet., with a hight of 32 inches, in a space of four minutes, and with a less expenditure of labor than by any other press yet invented. They are capable of exerting from 100 to 1,000 tuns pressure, and one man working alone can bring 100 tuns to bear. The machinery is very simple, and may be applied with equal advantage to presses for extracting oils. Hansbrow's California pump is chiefly distinguished for the ingenious adaptation of the leverage, by which immense power is saved and gained, so that a child might work it. The stream rises on the slightest movement of the handle, and when full power is put on it will throw a stream from a depth of 30 feet to a hight of 85 feet through 50 feet of hose. Another advantage is that the valves are so arranged as to insure a constant supply of water in the reservoir. A cotton planter's machine is exhibited close by, which was just coming into use in the Southern plantations when the war broke out, and which promised to be a great success. With two men and a horse it will do the day's work of eight ablebodied "chattels." There is also a corn and bean planter, which effects a still greater saving of labor. The exhibitor, Mr. Prindle, maintains that it will plant 20 acres of corn per day, either on even or uneven ground, and will do the work of 30 men per day. It requires but one man to work it, and is designed to plant two rows of corn or three rows of beans, the rows being made at any distance apart. It marks the furrows, drops any desired number of seeds, covers them, and presses the soil over them at any required pressure or depth. It has, too, an adjustable axletree which enables the guide to work the machine by the last-made track, and to plant rows of any desired width with uniformity.

In addition to the agricultural machines which were mentioned recently, there are a variety of reapers and mowers; a portable steam boiler, which can be carried anywhere to supply steam for working a machine or boiling food for cattle; a ditcher, which will cut a ditch of any depth or width, lift out the earth, and deposit it in any given place; and a self-regulating windmill, which turns its sails to the wind without any trouble to the miller. Batchellor & Sons exhibit samples of steel forks and rakes of such admirable temper that by fair usage alone it is almost impossible to break them. Blake's stone-breaker, which may be applied to crushing minerals of any kind, appears to be a machine of great power. It consists of two immense iron jaws, with graduated faces, one moveable and the other fixed. At every revolution of the crank by which the machine is worked, the moveable jaw advances toward the fixed jaw about a quarter of an inch, and returns, its return being aided by a strong spring of india rubber. If a stone be dropped in between the convergent jaws it is gripped and broken by the first bite, and the fragments fall lower and lower as they become smaller at every revolution of the crank, and are broken by each succeeding bite until they are small enough to drop out at the bottom. The distance between the two lower ends of the jaws, which determines the ultimate size of the fragments, can be regulated at pleasure. There is a model at work in the department which crushes the hardest pebbles with as much ease as if they were so many nuts, and a full-sized machine may be seen in the Eastern Annexe, though it stands idle for want of power. Lawrence, White & Brothers exhibit a lock nut and ratchet washer, which makes every bolt as secure as a rivet. The washer, which is first passed on the bolt to be secured, has a raised rim, on the inner side of which is formed a ratchet, and in a slot forged in the nut which succeeds the washer is fastened a spring of iron, steel, or brass, the latter being preferred, as it may be more easily bent when required, and will not rust, which fastens into the ratchet, and thus prevents the nut from unturning.

For securing railway metals the invention is of great value, and will, no doubt, be of service in preventing that large class of accidents which arises from loose rails. Another novelty exhibited here is Drake's boring and spacing machine, which is peculiarly adapted for boring the stiles for blinds or any other wood work where a series of holes is required to be bored at equal distances apart. There is a long row of spindles and bits, all fixed on one continuous belt, and all advancing by one single movement, and the distance between them may be lengthened or decreased by the simple movement of a lever. The shoe machinery at work here already excites great interest, and on the shilling days many a holyday-making Crispin may be seen gazing in mute astonishment at the marvelous rapidity with which the work is turned out. The blank sole-cutting machine will cut out 60 soles in a minute, and the stitcher will stitch them on, sewing through and through the upper leathers without the necessity of a welt at the rate of about 50 seconds for each shoe. The heel-trimming machine is capable of trimming one pair of heels in a minute on the shoe, and the leather-splitting machine reduces the soles to any required thickness.

The most important piece of machinery exhibited by the Americans is a power loom for weaving tufted carpets, which may be seen at work in the Machinery Annexe. It has already created quite a sensation among the trade, and in a practical point of view is perhaps one of the valuable novelties in the department. The great feature is that by a single throw of the shuttle it will insert, weave in, cut off, and complete one whole range of figuring tufts across the width of the fabric in less time than is required for the making of a single tuft by the hand loom. Any medallion design can be woven in parts, which may easily be united so as to have the appearance of being woven in one piece, as the salvage produced is such that when sewed the seems are not visible. The strain on the material is so slight that common worsted or woolen yarns of any quality may be used, so that the cheapest kinds of carpets may be produced in it. The economy of time, labor and material is so considerable that the machine will, probably, effect a most important revolution in carpet manufacture.

Besides these there are various other contrivances of minor importance, but all displaying wonderful ingenuity. Mr. Bates's mechanical apparatus for curing stammering deserves notice, though it is impossible to give any verbal description which would give an adequate idea of its operation. Mr. Ward exhibits a complete series of his signal lanterns, which form perhaps the simplest and most intelligible system of ocean telegraphs yet invented, and we must not omit to mention the sewing machines, of which half a dozen may be seen hard at work at all hours of the day. There are a few specimens of cereals, and the mineral wealth of the States is represented by a few cabinet specimens, the chief of which are from the Washoe silver mines. In this case are shown two or three samples of quartz said to be worth £2,000 per tun. The arts of the States are represented by Kentze's fine statue of "America," and a few pictures which are all worthy of a position where they would attract more attention. Cropsey's "Autumn on the Hudson" is a beautiful landscape. The pianos, we understand, have been highly praised by experts, and the most remarkable novelty among them is a piano exhibited by Mr. Hulskamp, in which, by applying an extraordinary tension to the sounding board, and by an arrangement of oblique braces transmitting the vibration, he obtains an unusual volume of sound in a very small space. Mr. Hulskamp also exhibits violins, to which the same principle is applied with the same results. Taking the American exhibition as a whole, there is no department in which the exhibitors will reap more profit from their pains, and perhaps that is as high praise as we can pass upon it.

Hand and Machine Sewing.

The Wheeler & Wilson Company have prepared tables showing, by actual experiments of four different workers, the time required to stitch each part of a garment by hand and with their sewing machine. The results were as follows :—

	BY MACHINE.		BY HAND.	
	Hours.	*Minutes.*	*Hours.*	*Minutes.*
Gentlemen's shirts	1	16	14	26
Frock coats	2	38	16	35
Satin vests	1	14	7	19
Linen vests	0	48	5	14
Cloth pants	0	51	5	10
Summer pants	0	38	2	50
Silk dress	1	13	8	27
Merino dress	1	4	8	27
Calico dress	0	57	6	37
Chemise	1	1	10	31
Moreen skirt	0	35	7	28
Muslin skirt	0	30	7	1
Drawers	0	28	4	6
Night dress	1	7	10	2
Silk apron	0	15	4	16
Plain apron	0	9	1	26

NUMBER OF STITCHES MADE PER MINUTE.

	By Hand.	*With Machine.*	*Ratio.*
Stitching fine linen	23	640	28
Stitching satin	24	520	22
Stitching silk	30	550	18
Seaming fine cloth	38	594	16
Patent leather, fine stitching	7	175	25
Fitting ladies' gaiters	28	510	18
Stitching shoe vamps	10	210	21
Binding hats	33	374	11

When the machines are driven by power the ratio is much higher, 1,500 and 2,000 stitches per minute not being an unusual average. Seams of considerable length are ordinarily sewed with the best machines at the rate of a yard a minute, and in a manner superior to hand sewing.

On a Black Varnish for Zinc.

M. Bœttger describes a process for covering zinc with a chemical, adherent velvet-black varnish. Dissolve 2 parts by weight of nitrate of copper, and 3 parts of crystallized chloride in 64 parts of distilled water; add 8 parts of hydrochloric acid of 1·10 density; into this liquid plunge the zinc, previously secured with fine sand; then wash the metal with water and dry it rapidly.

This coating constitutes a kind of metallic alloy. It is M. Bœttger's opinion, that characters in relief may be executed on a sheet of zinc by using this composition, and by employing dilute nitric acid (1 to 10), as the black coating resists the acid which attacks only the unpreserved metal.

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Correspondence

Information About Milling.

Messrs. Editors:—In my communcation last week I presented my experience on the modes of dressing mill stones. I will now give some information respecting the balancing of the stones. The balancing of the runner stone I regard as a matter of great importance. It frequently happens that a stone will be in good balance when at rest, but greatly out of balance when in motion. This is accounted for by the manner in which the weight on the back of the stone is disposed. For instance, the blocks composing the stone are sometimes thicker and heavier on one side, than on the other, and in backing up the stone, more heavy material is sometimes placed on one side, than on the other near the face. It is the custom, in order to secure a balanced stone to run some lead into it back on the light side, and as there is no means of ascertaining the right distance to place it from the face of the stone, it is liable to be placed too far above the face to be on a level with the weight on the opposite side, hence there is a heavy point on one side below the resting point of the stone on the spindle, and a corresponding weight above this point on the opposite side. As motion has the same influence on these weights as it has on the balls of a governor of a steam engine, the reason it is thrown out of balance when in motion is obvious. When we place one ball of a governor above its hanging point at the center of the shaft, and the other below this point, and then give it a rapid motion, that one ball is drawn down to find its level, while the other is drawn up. A millstone hanging loose on the top of a spindle is governed by the same law. The heavy point below the resting point on the top of the spindle, is drawn up when in motion, and the heavy point above is drawn down, causing the side carrying the upper weight to drag upon the bed stone. To remedy this evil, I balance the stone at rest in the ordinary manner, then raise it about ½ an inch above the face of the bed stone, and run it up to a grinding motion. I then take a shingle or thin piece of board, with a little paint on it, and push it carefully between the stones, when the heavy side will receive the mark of the paint. I then make a hole in the back near the skirt on the opposite side of the stone, and run in a quantity of lead to balance, and then put the stone in motion again. If it has not received sufficient lead, add a little more, and repeat the process until the face runs perfectly true.

From 1836 to 1844 is a period that will long be remembered by millers and millwrights, as the period that fast grinding was undertaken to be accomplished by means of heavy runners, and when little or no attention was given to dressing or hanging stones. I have seen runners of 4 and 4½ feet diameter, that weighed from 4,000 to 5,000 pounds. One half of this weight was worse than useless. It could not be used as grinding weight, and it bore heavy on the spindle step. The stone was top heavy and inclined to rock and injure the faces. It was then a common fault to crowd feed, and add pressure beyond the capacity of the stones to do good grinding. The consequences were rich offal and bad flour. The average amount of grinding with these heavy runners did not exceed 50 or 60 barrels per day without injuring the flour. This slow grinding was for the want of proper attention to dressing and hanging the stones, as has since been proven. A stone 4 feet in diameter, of good quality, and properly dressed and hung, weighing 2,000 pounds, and making 220 revolutions per minute, will grind upon an average 80 barrels per day, and do its work well when the wheat is in good condition. The first 24 or 36 hours after dressing they will make at the rate of 100 barrels per 24 hours, the amount lessening as the stones become dull, as a dull stone must be fed lighter or the flour will be injured. From 4 to 6 days is as long as it is profitable to run a stone without being taken up and cracked, although a stone of very sharp grinding properties may be run longer. Cracking should be governed by the quality of the stone, and the quality and condition of the wheat to be ground. A stone that is very sharp and porous, requires broader cracking than one that is dense and dull. In my experince I have found that a stone of medium quality requires about 20 cracks to the inch, with wheat in good condition. When the wheat is very dry, and the hull very brittle and tender, wider cracking is necessary, and frequently it is necessary to crack but one stone at a time, on account of cutting the bran too fine and specking the flour. When the stone is very dense, and the wheat damp and the hull very tough, I have found it necessary to crack as fine as possible without breaking the face between the cracks, and frequently to give the furrows a slight cutting edge the whole length. A berry of wheat is composed of innumerable small granules or round particles, and when pressed so close between the stones as to flatten these particles, the life of the flour is destroyed, and on rubbing it slightly between the thumb and finger it feels moist and clammy. In using such flour for bread, it will be found heavy, sticky and dark colored. When the grinding is not close enough to separate these particles of the wheat, the flour will be rough and harsh, and the bread formed of it will be dry and crumbling. There are many varieties of spring wheats, the Scotch Fife and Black Sea wheat requires a greater pressure to reduce it to its proper degree of fineness, than the Genesee and Michigan winter wheat. The Rio Grand and Milwaukee Club wheat require about the same pressure. There are other kinds that require higher grinding. In grinding Genesee and Michigan winter wheat, with all the grinding apparatus in perfect order, it will bear reducing to such a degree of fineness, that on observing the meal at the spout, it will have a very fine, smooth and round appearance, and feel pleasantly between the fingers. With the grinding apparatus imperfect, the meal cannot all be reduced to this state of fineness. Some portions will be too fine and some too coarse, hence the necessity of keeping all that pertains to the grinding in the most perfect order. Wheat should be ground as close as possible without injuring the flour, as it secures a greater portion of gluten, which is the choisest part of the flour.

J. R.

Ann Arbor, Michigan, June, 1862.

An Invention of the Empress of France.

Messrs. Editors:—We noticed in No. 24, on page 379, Vol. VI., Scientific American, an article under the heading "An invention of the Empress of France," and supposing this statement to be true we regard it as a challenge to industrial inventors; it is stated to be a skirt whose making sets its face against sewing machines, as there is none yet, as intimated in the article referred to, capable of effecting hemstitching or embroidering. By the introduction of sewing machines in manufacturing industry, it has become, long since, an instrumental necessity. Accordingly we did put our intellectual and physical faculties at work toward making a machine that would do what was needed; after years of persevering labor we had the satisfaction of obtaining a machine that is capable, among the various kinds of work it does, of hemstitching, embroidering (*au plumeti*), or mat embroidering, festoon stitching, button holes, &c., all of which were acknowledged by expert judges to be a perfect result for these kinds of work, who pronounced our invention to be one of great value. Having applied and obtained a patent right for it through your Agency, we take the liberty of referring your readers to our claims, which were published in your valuable paper, on page 235 of your last volume.

This proves that this American invention had the lead of that of the Empress of the French. The want of pecuniary means only has prevented us from introducing it to the public. Having performed what we consider our duty toward American ingenuity, there still remains one more to be performed on our part toward you, gentlemen, for the able manner in which you obtained for us our patent right for the above-mentioned invention, for the correct specification you made of the several motions of our machine, also for the good counsel we received gratuitously at your hands in the course of our consultations at your office, and the kind, patient and enlightened treatment we received at the hands of the person who had charge of our business at your office. We therefore cheerfully recommend your Agency to all inventors desirous of obtaining a patent right. As for us, as soon as we have the means we will call on you again to obtain a patent right for an improvement in our sewing and embroidering machine.

Derocquigny, D. Gance and Hanzo.

New York City, June 20, 1862.

Balancing Saw Frames.

Messrs. Editors:—In all wheels and shafts running at high speeds, any unbalanced part will act centrifugally on the shaft, absorb power and produce irregular motion. If cog wheels form component parts of the system, back lash and destructive wear will result as a necessary consequence of vibrating motion.

It is the practice of some mill wrights to counterbalance saw frame, connecting rod and all the parts which move with them. This is all right when the motion is slow, because the system is composed of parallel counteractive forces: that is, it is balanced.

But when the velocity in high, as all good mills run now, the relations of the parts are changed, the counterbalance becomes strongly centrifugal, ceases in part to act against the saw frame, causes violent surging of the crank shaft, back lash among the cogs, and injurious oscillations in all the working parts and frame work of the mill.

I would recommend this:—Balance the crank pin and hub in which it is fastened, the stub end of connecting rod, and about one third of the rod; make the fly wheel heavy, and balance all the wheels and shafts; make the connecting rod and saw frame as light as possible. If these things are attended to, the whole system must work well.

J. H. Cooper.

Philadelphia, Pa., June 24, 1862.

Messrs. Editors:—I inclose an article from the Scientific American, and take the liberty of stating that our returns exhibit no rice as stated. Unofficial tables, procured in advance of revision and correction may, and probably do, contain errors such as you refer to, but this should not lead to the condemnation as "worthless" of what has not yet been published by my sanction.

I believe the census to have been better taken than ever before, and regret that efforts should be made by such a paper as yours to prejudice the public unfavorably as to its reliability and merits. The "horses" of Boston will be represented.

J. C. G. Kennedy.

Census Office, Washington, June 23, 1862.

[The article to which Mr. Kennedy refers appeared in our last volume. Our information was obtained from the Report of the Massachusetts State Agricultural Society. We are glad to know that Boston will not be officially deprived of all horseflesh.—Eds.

Discoveries of Copper and Niter in California.

Messrs. Editors:—The reason why I have not answered your last letter sooner is that I have been away from home for some time on a tour through the southern portion of this State, on a search for copper and tin. I found copper equal to the Lake Superior mines, besides an abundance of plaster of the best kind, and a fine niter bed in combination with crystals of common salt. This State abounds in mineral wealth. Within the past two years I have discovered no less than five silver leads or lodes, that will pay from 25 to 480 dollars per tun. There have been found, within two and a half years, between one and two thousand silver lodes in California. One thing very much needed here is some cheaper process for reducing the poorer ores. This is a good opening for some of your chemists.

Elisha Hughes.

McCartysville, Cal., March 29, 1862.

Large Strawberries.

Among the fine varieties of strawberries which have been originated within a few years, one of the largest and best is Russell's Seedling. The plants have all been purchased by George Clapp, of Auburn, N. Y., from whom we received a box of magnificent berries a few days since. Mr. Clapp says that he has been cultivating the plants for six years, and is now nearly ready to put them in market. As soon as he decides on the price and is prepared to deliver the plants, notice will be given in the Scientific American. We measured one berry that was 4⅜ inches in circumference; and the fruit is of rich color and excellent flavor.

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ARTIFICIAL PRECIOUS STONES.

BY W. G. HOWGRAVE.

Since Sir Humphry Davy first discovered the diamond to be pure carbon, unmixed with any other substance, various attempts have been made by chemists to produce it, and other precious stones, by artificial means; and it may not be uninteresting to glance at some of these essays, and to see how far they have been attended with success.

But little progress has as yet been made toward the discovery of the means of imitating the natural diamond, men of science have hitherto been baffled in all their efforts to find a substance capable of dissolving carbon, the chief constituent of that crystal; and indeed, until Despretz succeeded, by the agency of electricity, in actually producing minute diamonds, the manufacture of this precious stone seemed as chimerical as that of the philosopher's stone, so perseveringly sought after by the ancient alchemists. Despretz found, that by passing a powerful galvanic current through a point of charcoal over which a platinum wire was suspended, the charcoal was volatilized and deposited on the wire in the form of minute crystals, which, on examination under the microscope, proved to be true diamonds. Since the discovery, no further advance has been made toward the solution of this interesting problem.

The search after the diamond having proved so unsatisfactory in its results, attention was directed to a class of stones almost as simple in their composition, going under the generic name of *corundum*. In order to understand the experiments that were made, and the difficulties attending them, it is necessary that a clear idea should be obtained of the compositions and distinctive characteristics of the stones belonging to this class. I will, therefore, in as few words as possible, give a description of their nature and properties.

The ruby, sapphire, oriental topaz, and several other precious stones, are all merely colored varieties of a mineral called corundum, or white sapphire, the composition of which was stated by Chenevix to be alumina, mixed with a small proportion of silica and oxide of iron. Dr. Thomas Muir and others proved, however, that it was pure alumina, the silica found by Chenevix being abraded from the substance in which the stones were imbedded. All the varieties of corundum crystallize in six-sided prisms, and have the curious property of double refraction; that is, causing everything that is looked at through them to appear double. Alumina, the oxide of the metal aluminium, now coming into such frequent use in the manufacture of articles of jewelry, &c., was, until the invention of the oxyhydrogen blowpipe, supposed to be, like carbon, infusible by any degree of heat. In 1837, however, M. Gaudin, who had given much attention to the effects produced by this then newly-invented means of generating heat on various metallic oxides formerly thought unsusceptible of fusion, attempted with some success to convert, by its aid, the apparently infusible alumina into crystals similar to the ruby and the other oriental stones. He proceeded by submitting to the action of the blowpipe a mixture of alum (sulphate of alumina and of potash) and chromate of potash, which he placed in a cavity of animal charcoal. In this manner he obtained small portions of melted alumina, having the color and hardness of the ruby, but which could be easily distinguished from it by their imperfect transparence, and by their not possessing the property of double refraction. All subsequent attempts to obtain crystals of alumina, colored like the precious oriental stones, have failed in a similar manner; and this has been accounted for by the discovery only lately that the color of these stones is not due to a metallic oxide, as had been always supposed, but to the presence of some organic coloring matter. The application of this discovery may bring us nearer than we have ever yet been to the invention of a mode of producing artificially these rare gems.

The next step in this direction was made by the manager of a manufactory of Sevres porcelain, named Ebelmen, who, ten years after M. Gaudin's experiments, found out a way of obtaining crystals of corundum, but of such minute proportions as to be of no practical use. He first discovered that boracic acid, which had been hitherto supposed to be absolutely fixed, could be evaporated by the intense heat of the porcelain ovens; upon this it occurred to him that by dissolving alumina in boracic acid, which could be done by heat, and then evaporating the liquid, it would be possible to obtain crystals resembling the oriental stones; and it was found, in fact, that by exposing a platinum capsule containing such a mixture to the heat of the porcelain oven for a considerable time, the boracic acid was evaporated, and a number of little shining crystals of alumina, having the properties and appearance of small precious stones, were left adhering to the capsule, but adhering so tightly that it was found impossible to detach them entire.

One other experiment is worthy of notice before proceeding to the only one which had any practical result; it is that of M. de Senarmont, who obtained similar microscopic crystals by exposing hydrate of alumina, or alumina combined with water, to a great heat, which caused the water to evaporate, and left the crystals at the bottom of the glass tubes in which the experiment was conducted.

The perseverance of M. Gaudin, who appears never to have abandoned the idea of manufacturing precious stones, enabled him, in 1857, to present to the Academy of Sciences several white sapphires produced by a very simple process, and of sufficient size to be used as jewels in watches.

The following is the mode of procedure by which M. Gaudin succeeded in producing these crystals:—

In a crucible lined with animal charcoal are placed equal parts of alum and sulphate of potash, previously calcined to expel the water. With this mixture the crucible is half filled; it is then filled up to the top with animal charcoal, the lid is put on and cemented in its place with clay, and it is then exposed in a furnace, and kept at a white heat for a quarter of an hour. The heat and the reducing power of the charcoal cause the formation of sulphuret of potassium, which fuses and dissolves the alumina; the continued action of the heat partly evaporates this sulphuret of potassium, and the alumina separates in the form of little crystals. On opening the crucible, a black mass, sparkling with brilliant points, is found in it, which consists of sulphuret of potassium mixed with crystals of alumina. This mass is afterward placed in diluted nitro-hydrocloric acid, which dissolves the sulphuret, and lets fall the crystals of alumina to the bottom of the vessel, where they appear as a coarse powder, and seen through a microscope, have an exact resemblance in form to the natural precious stones. By using a larger crucible, and exposing it to the action of the fire for a longer period, M. Gaudin produced crystals of much greater dimensions, which, upon examination, proved to be true white sapphires, and were even superior in hardness to the rubies ordinarily used for the jeweling of watches. He endeavored to produce colored crystals by the addition of metallic oxides, but found that these were invariably reduced into metals by the action of the charcoal. The successful result of this experiment encourages us to hope that at a future period M. Gaudin, or some one else possessed of his indomitable perseverance, may discover some substance capable of dissolving carbon in a similar manner to that in which sulphuret of potassium has been found to dissolve alumina, by which the problem of the artificial production of that beautiful and valuable stone, the diamond. will at length be solved.

Although not belonging strictly to the subject of the artificial production of precious stones, it will not, perhaps, be thought inappropriate to notice some experiments undertaken by Messrs. Deville and Wohler, which resulted in the discovery of a crystal strongly resembling the diamond in its hardness and properties, although of a different composition. This crystal is that of a substance called boron, which attracted the attention of Messrs. Deville and Wohler on account of its resemblance to carbon. It occurred to these gentlemen that a substance having such a great similarity to the element of which the diamond is composed would, in all probability, if crystallized, have some characteristics in common with that gem. They, therefore, set to work to find some process which would enable them to reduce it to the crystalline form.

Boron is only found in nature in combination with oxygen, as boracic acid, and in union with soda as borax; and it had, up to this time, been obtained from these combinations only in the form of a brownish green powder, insoluble in water, possessing many of the properties of carbon. It was reserved for the two chemists whose names are given above to produce it in a form hitherto unknown, by the following process:—

In a crucible lined with animal charcoal are placed eighty grains of aluminium and one hundred grains of boracic acid; this crucible is then exposed for five hours to an intense heat, which causes a portion of the boracic acid to part with its oxygen to the aluminium. After it has been taken from the furnace and allowed to cool, it is found to contain a sort of glass composed of the remainder of the boracic acid and of the alumina formed during the process of heating, and underneath this a gray metallic mass sparkling with crystals. This mass consists merely of boron imbedded in aluminium. To separate the boron, the mass is plunged into boiling caustic soda, which dissolves the aluminium, and is afterward treated with hydrochloric acid, to remove all traces of iron, and with a mixture of nitrate and hydrofluoric acids, to get rid of any silicon that may have been left by the soda. After all these processes have been gone through, the boron remains alone.

An examination of the boron obtained in this way shows that a great analogy exists between it and carbon, which, as every one knows, is found in three forms: uncrystallized in charcoal; semi-crystallized in plumbago; and crystallized in the diamond. Similarly the boron resulting from the above experiment is found to exist in three forms, namely, in black flakes almost as hard as the diamond; in brilliant prismatic crystals less hard than the former variety; and in small, beautifully-formed reddish crystals, having a great resemblance to the diamond. These crystals are as hard as the diamond itself, and may, in the course of time, should their manufacture be brought to perfection, supersede that stone in many of its uses, such as cutting and polishing precious stones, forming jewels in watches, &c.; and thus, although from their being unknown in nature they can not be considered precious stones, the discovery of these boron diamonds may prove of more practical value than all the attempts at the artificial production of the real diamond.

Another Good Word.

THE SCIENTIFIC AMERICAN.—The next number of this valuable journal will commence a semi-annual volume, and it is therefore a most excellent opportunity to subscribe for it. The writer of this watched its course since its first publication in 1845, seventeen years since, and its uniform intelligence, candor and general reliability upon all subjects falling within its range, has challenged our admiration and respect. It has attained a larger circulation than any other paper of its class in the world, and is the lowest in price, the leading English scientific papers being treble its price per annum. The SCIENTIFIC AMERICAN is devoted to the interests of popular science, the mechanic arts, manufactures, inventions, agriculture, commerce and the industrial pursuits generally, and is valuable and instructive not only in the workshop and manufactory, but also in the household, the library and the reading room. We shall continue, as heretofore, to make liberal use of the AMERICAN in enriching the columns of the *Express.—Rochester Express.*

What is Heat Lightning?

The flashes of lightning, often observed on a summer evening, unaccompanied by thunder, and popularly known as "heat lightning," are merely the light from discharges of electricity from an ordinary thunder cloud beneath the horizon of the observer, reflected from clouds, or perhaps from the air itself, as in the case of twilight. Professor Henry says that Mr. Brooks, one of the directors of the telegraph line between Pittsburgh and Philadelphia, on on eoccasion, to satisfy himsely on this point, asked for information from a distant operator during the appearance of flashes of this kind in the distant horizon, and learned that they proceeded from a thunder storm then raging two hundred and fifty miles eastward of his place of observation.

THE Schenectady N. Y. Locomotive Works are constructing some engines for canal boats, which are much on the locomotive principle.

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Improved Bar Register.

The pretty little piece of cabinet work, two pictures of which are embraced in the annexed engraving, is intended for the convenience of barkeepers—a class far too numerous in this country. The inventor says, and it is presumed that he knows, that there are frequently loafing about bar rooms persons so mean that when they see a company drinking they will step up and take a glass without any invitation, and hence, in settling, disputes are liable to occur between the barkeeper and the person giving the treat. To effectually prevent these disputes, and also to provide a check on the money receipts of the barkeeper, is the object of the invention here illustrated.

Fig. 1.

Fig. 2.

M'NAMEE'S BAR REGISTER.

A number of red balls are placed in the apartment marked DRINKS, and a number of white balls in that marked SEGARS. If a person wants one drink he calls for it, and at the same time drops a red ball in the pigeon hole marked 1. The ball rolls through the cabinet to the back side where it drops into a box with a glass front in plain sight of the barkeeper. The barkeeper allows it to rest till he is ready to make change, the ball thus forming a record of the number of drinks ordered. When the drink is paid for the barkeeper turns the bottom of the box in which the ball rests, by means of a knob at the side of the cabinet, when the ball falls into a locked drawer below, preserving the record of the number of drinks sold. If a customer order two drinks, he drops a ball into the pigeon hole No. 2, when it falls into a compartment in the drawer of a corresponding number; and it will be seen that provision is made for any number of drinks from one to twelve. Beyond this it is not supposed that any treater will go, except politicians in election time, for whom no adequate provision can be made.

The apartment marked SEGARS contains a number of white balls, and when a customer orders a cigar, he will drop one of these balls into a pigeon hole numbered to correspond with the price of his cigar; if a six-cent cigar he drops a white ball into No. 6, and so on.

The drawers are locked with keys of peculiar construction, difficult if not impossible to duplicate, and the keys are carried by the proprietor, who, by opening the drawers every night and counting the balls in each compartment, can ascertain exactly how much money his barkeeper has received.

It is said to be a matter of common observation that barkeepers generally buy out their employers in about three years, but it is supposed that by means of this register the relations of employer and employed may be somewhat longer preserved.

The patent for this invention was granted, through the Scientific American Patent Agency, June 10, 1862, and further information in relation to it may be obtained by addressing the inventor, James McNamee, at Easton, Pa. [See advertisement on another page.]

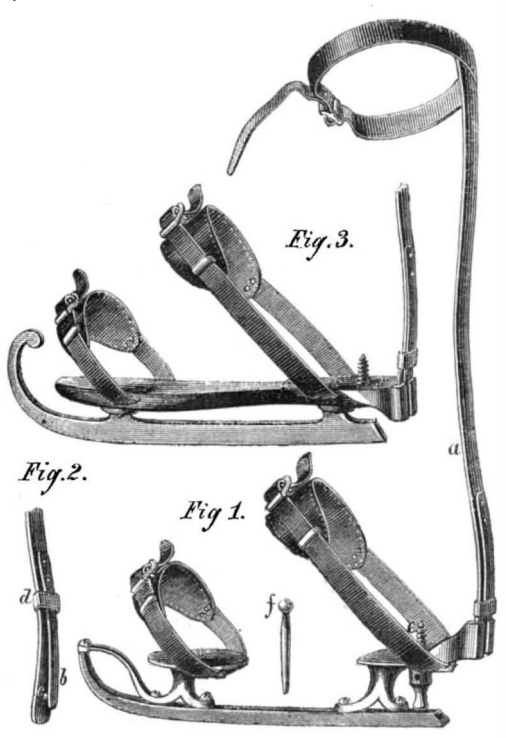
Business in Lynn.

The Lynn, Mass., *Reporter* states that a great deal has been done in that place during the present season in the erection of buildings as compared with previous years. It also says:—"Carpenters and masons as well as shoemakers and other mechanics, have been and still are full of business and good prices. We can scarcely pass through a street in the city without seeing some evidence of thrift and a desire for improvement, either in the way of building, repairing or painting buildings, replacing fences, trimming up gardens and the like. This is the natural result of an improved state of trade, and a more free circulation of the "needful," without which almost everbody feels too poor to "improve" on anything. We should lack space to enumerate one half of the improvements that have met our eye in our walks about town."

JEBB AND CUTLER'S ANKLE-SUPPORTING SKATE.

Another improvement in skates! It would have been naturally supposed that an implement so simple as this certainly could not require a very large number of improvements, but since skating became so fashionable as to create an extraordinary demand for skates, devices for making them better or for rendering them more convenient of adjustment or in some way more nearly perfect, have come forth in astonishing variety, and we begin to think that even this little department of invention will never be exhausted.

The skate here illustrated was invented by Thomas Jebb and Abner Cutler, of Buffalo, N. Y., who have assigned the invention to George D. Teller, of the same place. Its principal feature is the ankle support. This is a thin strip of tempered steel, *a*, Fig. 1, which is inserted into a slot in the rear end of the



heel plate, and is secured at the upper end to the leg of the skater by a strap around the calf. The mode of securing this ankle support is shown in Fig. 2. A thin steel spring, *b*, is fastened to the back side of the support, and carries a pin, *c*, on its lower end, which projects forward, passing through a hole in the heel plate. It is held in place by slipping the loose band, *d*, down near the heel plate.

As the projection provided on the heel plate to receive the lower end of the ankle support would prevent the screw, *e*, from being turned into the boot heel, by turning the whole skate in the usual way, this screw is fitted to turn independently of the heel, and a small bar, *f*, is provided for turning it; the end of the bar fitting into holes in the shank of the screw.

For adapting this ankle support to skates with wooden stocks, a heel plate is made to be secured by wood screws upon the stock, and the projection to receive the support is turned downward in order that the screw may be turned into the heel in the usual manner; see Fig. 3.

The other peculiarities of this skate are manifest on an inspection of the cut.

It is well known that the principal fatigue in skating comes from the great strain on the ankles, and as this support is very thin in the longitudinal direction of the foot, while it is broad in the transverse direction, it supports the ankle firmly sideways, though yielding freely in the opposite direction. We are assured that new beginners and ladies find it a great assistance, and that old skaters are able with its use to continue the exercise for hours without any considerable fatigue.

The patent for this invention was granted July 2, 1861, and further information in relation to it may be obtained by addressing the assignee and manufacturer, George D. Teller, at 170 Main street, Buffalo, N. Y.

Penetrating Armor Plates and Punching Iron.

An intelligent writer in the *Mechanics' Magazine* in the course of a series of articles on "The Iron Walls of Old England," makes the following remarks:—

The term penetrating force, and penetrating effect, are used with great laxity. They have been so used in reports of experiments to such an extent that their true meaning has been lost sight of. By penetrating force or effect, as applied to an iron projectile striking an iron plate, I understand the power of the shot to pass through or bury itself in the material of the plate, supposing the plate to be held firmly in its place without motion or vibration, and without any yielding of the back support on which it bears. To exemplify my meaning I will refer to the familiar example of a punching machine punching rivet holes in a plate. The effect produced in that case is the penetrating effect of iron, or rather of steel on iron.

Now, in this operation there is a law known to every boiler maker. No force will drive a punch through a plate unless it be of greater diameter than the thickness of the plate. A one-inch steel punch will not go through a one-inch iron plate; it will go through a $\frac{3}{4}$ or perhaps a $\frac{7}{8}$-inch plate; but if the punch, instead of being of steel, were of iron, it probably could not be driven through a $\frac{1}{2}$-inch plate. Experiments have been made which invariably have resulted in the punch or the machinery being broken if the former has been less in diameter than the thickness of the plate. Here, then, we have a law which applies to projectiles in the shape of cannon shot, which are punches propelled with the explosive force of gunpowder. Pursuing the analogy of the punching process, if a plate were placed under a punching machine without a die or a solid support at the back of the place struck, the punch would not penetrate the plate. It might, if there were no support behind the plate, or if the plate were placed on a plank of wood, bulge and perhaps crack the plate, but it would not pass through it. I think, then, the nature and extent of the penetrating force of iron projectiles against iron plates is clearly defined by the punching process, and the truth of this definition is confirmed by numerous results of target experiments, showing that where the backing was hard, and rigid, and did not give way, the amount of penetration of the shot into the iron was extremely limited.

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NEW YORK, SATURDAY, JULY 12, 1862.

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THE LONDON TIMES ON AMERICAN EXHIBITORS.

On another page will be found an article from the London *Times* on the American department of the great Exhibition, which closes with the remark,—"Taking the American exhibition as a whole, there is no department in which the exhibitors will reap more profit from their pains, and perhaps this is as high praise as we can pass upon it."

Considering that the *Times* is an habitual slanderer of this country, and considering the other circumstances of the case, we regard this as very high praise. It is gratifying to us less as a tribute to the skill of our countrymen, than as a testimony to one of the many beneficent operations of republican institutions.

The *Times* says that our exhibitors will reap profit for their pains. This means that our manufacturers, by displaying their wares, are to find a sale for them in Europe. Now, there is only one way in which our manufacturers can compete with those of Europe in European markets; and that is by conducting their operations with superior intelligence and skill. All other advantages are on the side of the European manufacturer; his capital is cheaper, his labor is cheaper, and the market is at his own door. But all of these great and usually-controlling advantages have been repeatedly overcome by the greater intelligence with which the American manufacturer has prosecuted his business.

This superiority has generally been shown in the larger use of labor-saving machinery—substituting the great forces of nature for the feebler power of human muscles. The introduction and use of this machinery has been materially facilitated by the superior intelligence of our mechanics and laborers. The spinning jenny, the steam engine, and nearly all of the great labor-saving machines that have been invented and introduced in England, have been at first broken in pieces by mobs of workmen under the foolish apprehension that they would cause a reduction of wages. But our mechanics, so far from objecting to the use of labor-saving machinery, keep their minds constantly on the stretch to devise improvements in mechanism by which still greater saving of labor will be effected.

This constant effort of the great mass of the community to facilitate still further the operations of industry is doubtless to a great extent due to our liberal patent system, with low fees, but it also results, in no small degree, from that "many-sided culture" that Grote dwells upon as the most destinctive characteristic of the ancient democracy of Athens, and that has characterized every democratic community of which history has preserved the record.

This many-sided culture is seen to a larger extent in England than most of the countries of continental Europe, because of the large democratic element in the English constitution, and it has been more fully developed in this country than ever before in the history of mankind, because here democratic institutions have received their fullest development. It is a different thing from the study of books, though it is aided by early school education to an extent than no one can fully appreciate. It has been immeasurably advanced by those public schools which were established by the middle class of Englishmen who settled our Northern States, and who would long since have established similar schools in the mother country, had it not been for the instinctive jealousy of that privileged nobility and hierarchy of which the London *Times* is now the champion.

FORGING—STEAM AND TILT HAMMERS.

All the branches of engineering are mutually dependent upon one another. This age is particularly distinguished in the construction of gigantic engines. Some of these great motors exert a power equal to three thousand horses. The construction of their different parts involves a vast range of inventive genius and the employment of a great variety of machines. It is an undeniable fact that mechanical engineering has attained to its present dimensions and perfection through improved tools, such as lathes, planers, slotting machines, steam hammers, &c. Such tools are required to form the several parts of self-acting motors; and, again, these tools are driven by these motors, hence their mutual dependency. A steam hammer may be called a tool on account of its office although it is really a peculiar steam engine. Its office is to forge masses of iron and steel and form them into important parts of machines. Without the application of the mighty power of steam in this direction, we could not obtain those huge shafts, cranks and beams required in the construction of the great engines which are now fabricated. The steam hammer is one of those useful inventions by which progress and improvement have been made in all branches of the mechanical arts to which it has been applied. It has effected a great saving in the several kinds of manual labor, and it may be guided to forge a needle or a shaft of many tuns weight.

The chief merits of modern engines depend, perhaps, principally upon the forged work used in their different parts. Formerly shafts, beams and the framing of marine and other engines, were mostly made of cast iron; now, however, they are made of wrought iron. Increased strength and greater durability have been secured by the change. Much, however, in the character of forged work depends upon the skill of the operator. The steam hammer can only strike the blow, the operator must guide it.

With respect to the principles of operating steam hammers, J. W. Nystrom, C. E., in his "Hand-book of Engineering," states that a heavy hammer, with a short fall, produces a better forging than a light hammer with a high fall. "This is accounted for," he says, "by the inertia of the ingot forged. The effect of the blows of a heavy hammer and short fall will penetrate through the metal, and nearly with the same effect on the anvil side, while a light hammer and a high fall will effect the metal on or near the surface of the blow." In guiding the force of the hammer to produce good forging, he also gives directions which should be followed by all blacksmiths. He states that in forging a large shaft it is generally piled up with iron bars, and when placed under the hammer at a welding heat, very light and gentle blows are first given for which a light hammer may be used, but afterward a heavy hammer, to squeeze the whole mass together in order to produce a sound welding.

He says respecting imperfect forgings:—"I have often seen, in broken shafts, the bars in the center as clean and unwelded as when first piled, which is a sure indication that the shaft had been forged by a hammer that was too light."

One great object in forging should be to secure the exact size and form of the article—rod, crank or whatever it may be—as near as possible, so that very little work will be necessary, afterward, in turning or planing to fit it into its appropriate place. Another reason for being careful in obtaining perfect forgings, is to obviate the removal of much of the surface of forged metal by planing or grinding afterward, because the interior of large forging is generally not so strong as the portions near the surface. It has frequently occurred that large crank shafts forged under a light steam hammer, have had the very best parts of the metal removed by planing and turning in the machine shop. This advice is also applicable to large castings. These should be as perfect in form as possible when removed from the molds, because the metal at the surface is generally stronger than in the interior. Shafts that are judiciously forged under a heavy hammer are generally more uniform in strength than those forged under a light hammer.

The oldest form of those large hammers which superseded manual power, is the tilt hammer, which was first driven by a cam roller secured on the shaft of a water wheel. Its action otherwise is exactly similar to a sledge hammer, and it is still in common use, operated either by steam or water power in almost every machine shop. The weight of such hammers ranges from 50 lbs. to 400 lbs., according to the purposes for which they are employed. For forging nail rods a hammer of 50 lbs. is used; for forging blooms of 60 and 100 lbs. in weight, hammers of 300 and 400 lbs. are employed. Iron and steel helves do not stand the vibrations so well as wooden helves. In operating tilt hammers they are usually thrown up by striking down upon the butt ends of their helves. This action makes them vibrate upon their fulcrum pins. The power of the blow, according to Overman, increases with the ratio of the weight and according to the square of the speed. "If the hammer," he says, "strikes with 100-lb force when seventy strokes per minute are made, it will, when 140 strokes per minute are made, strike with a force of 400 lbs. The same rule is applicable in relation to the space described by the hammer. If the hammer, lifted 10 inches, strikes with a force of 1,000 lbs., it will, when lifted 20 inches, strike with a force of 4,000 lbs." In operating such hammers, therefore, a double speed requires four times the steam or water power.

In the London International Exhibition are shown some immense iron forgings, one piece from the works of a Liverpool firm weighing over 24 tuns. The same party exhibit a forged armor plate 21 feet 3 inches long, 6 feet 3 inches wide, and 5¼ inches thick, having a superficies of 133 feet and weighing upward of 13 tuns. But in mammoth steel forgings the Germans bear away the palm. The celebrated Herr Krupp exhibits an ingot *broken*, each fragment weighing 10½ tuns. It is 44 inches in diameter, and when

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whole was 8 feet long. About one-fourth of the section was cut away to enable it to be severed and then it required 150 blows of a 50-tun hammer fully ten feet to break it.

In another article we shall present information respecting the history and different kind of steam hammers.

GINNING SEA-ISLAND COTTON IN BROOKLYN.

When the Union forces, last fall, took possession of the islands on the coasts of South Carolina, Georgia and Florida, the planters fled, leaving large quantities of unginned cotton behind them. Much of this cotton was collected and sent to New York, consigned to collector Barney, to be sold as confiscated property. Knowing that it would bring very low prices, and that it was unfit for shipment abroad in its unginned condition, he took measures to have it cleaned to prepare it for sale. For this purpose a contract was made with Mr. F. H. Lummus, of Williamsburgh, L. I., assignee of the patent of Brown's Excelsior Gin—Patented March 23, 1858, and described on page 235, Vol. XIII. SCIENTIFIC AMERICAN (old series). When this contract was made there was only one of these gins in this city, but measures were at once taken for the construction of several, a large brick building as a gin house was leased, in King street, near the Atlantic Docks, South Brooklyn, and here there are now eighteen of these gins running constantly, and four more will soon be added to the establishment. Sea-island cotton is distinguished for its long and silky fiber, but in its unclean condition it is a useless-looking substance, resembling knots of wool, each with a hard black seed in its center, to which the cotton adheres as sheep's wool to a burr. The ginning operation consists in removing the cotton from the seed. Whitney's famous saw gin cannot be used for cleaning this staple of it, because it would injure the long fiber. The old sea-island cotton gin consists of two long wooden rollers set closely together. The cotton was fed against the rollers, the fiber was drawn between them, and the seeds were prevented from passing through, and thus this cotton was formerly cleaned.

The McCarty single-roller gin was a great improvement over the old double-roller gin; Brown's gin consists of a single roller, a steel breastplate, and a vibrating stripper by which the seeds are thrown down behind and through a grating, while the cleaned cotton is delivered in front. To present some idea of its construction and operation, we will state that it almost resembles a box about three feet in hight, three feet in width and the same in length. In front and on the top is a leather covered wooden roller, about five inches in diameter, and 36 inches in length. The leather with which it is covered is formed of strips two inches in width, wrapped spirally around it, tacked down at the edges, and beveled so as to form a spiral groove from end to end. Behind this roller is a steel breast plate, almost resembling a broad and long shaving knife. It is of exquisite and peculiar temper, and made by Henry Diston, of Philadelphia. The edge of this plate presses close against the back of the roller, and above it extending across is a vibrating or stripping bar, which plays up and down like the crosshead of a saw gate. Behind this is the feed board which has an iron grating situated close to the breast plate. The uncleaned cotton is placed on the feed board, and is pressed forward in a stratum by the girl that attends the gin. The machine is driven by band and pulley, the roller rotates downward toward the steel breastplate, and draws the fiber of the cotton between the roller and the steel plate. There is not sufficient space for the seed to pass through between the roller and the breastplate scraper; therefore the seed is left behind, and the vibrating stripper strikes down upon it, executing a series of small blows which knock off the seed, driving it through the grating, and into a receptacle below the feed board. The uncleaned cotton goes into the gin behind a mass of black and white knots; it comes out in front, a beautiful white silky looking fiber. A cord is stretched in front from side to side across the roller, to prevent the cotton from being carried around and clogging the gin. When a gin is first started, the ginned cotton drops from the roller freely, but after running for a short period, the roller becomes so positively charged with electricity, that the cotton is attracted to it, and would be carried round and round but for the stripping cord in front. One of these gins will clean from 200 to 250 lbs. of cotton per day, in a superior manner, but it can also be run to clean 500 lbs. Cotton requires to be very dry for ginning freely. During rainy weather, and when the atmosphere is charged with moisture, the ginning proceeds very slowly. In dry clear days the cotton is spread upon the roofs of extension buildings attached to the main building, for the purpose of removing all the moisture from it. The top story is also employed as a drying room during wet weather. An engine of 30-horse power is placed in an adjacent low building for driving the gins, which are situated on the second floor, and the ginned cotton drops through openings to the first floor, where it is taken and placed in long bags. The baling of this cotton is a rather curious operation. Round holes are cut in this floor opening into the basement. Bags are placed in these holes, and suspended in them with their mouths wide open, and lips fastened to the floor. Two active "contrabands," in Government service, and who were accustomed to this business in Dixie, do the baling. They place armful after armful of ginned cotton in these bags, get into them and tread it down with their feet, and also pound it with an iron bar, and thus they pack in layer upon layer until a bag is filled. This is severe labor, and it seemed to us that it could be performed by machinery, but we were informed that although short staple cotton may be pressed in a machine and sent in safety to Europe, sea island cotton when pressed in bales and sent abroad loses all its strength of fiber before it reaches England. This can only be accounted for by *eremacausis* taking place in the cotton when so packed. Why should this be so is an important inquiry. We believe that this cotton may be packed in a press, and any required degree of pressure given, so that it may be as safely carried to Europe, as when packed by manual labor. As a telling fact in favor of free labor, we were informed, that any one of the girls attending these gins could do as much work in one day as three slaves. Here each of the two colored cotton packers packs six bales per day, under the stimulant of freedom, while in the South three bales per day was held to be a good day's work.

The ginned and baled cotton is taken from this house to the Government storehouses, and when a sufficient quantity is ready for sale, it is advertised and sold at auction. About five million pounds of Government cotton have arrived at the Atlantic Docks, Brooklyn; about two million pounds of which have been ginned and sold. More is expected to arrive shortly, and especially some of what is called "Coffin Cotton," a species cultivated on Col. Coffin's plantations at Beaufort, S. C., and which is stated to be the largest and most beautiful staple that comes to market. Almost all the sea island cotton that is raised, is bought for English spinners to be spun into thread and yarn for making lace, lawn gauze and fine muslins.

Extracts from Agassiz.

From the article by Agassiz, on "Methods of Study in Natural History," in the July number of the *Atlantic Monthly*, we take the following extracts:—

I have spoken of the plans that lie at the foundation of all the variety of the animal kingdom as so many structural ideas which must have had an intellectual existence in the Creative Conception independently of any special material expression of them. Difficult though it be to present these plans as pure abstract formulæ, distinct from the animals that represent them; I would nevertheless attempt to do it, in order to show how the countless forms of animal life have been generalized into the few grand but simple intellectual conceptions on which all the past populations of the earth as well as the present creation are founded. . . . . .

There is nothing more striking in these early populations of the earth than the richness of the types. It would seem as if, before the world was prepared for the manifold existences that find their home here now, when organic life was limited by the absence of many of the present physical conditions, the whole wealth of the Creative Thought lavished itself upon the forms already introduced upon the globe. After thirty years' study of the fossil crinoids, I am every day astonished by some new evidence of the ingenuity, the invention, the skill, if I may so speak, shown in varying this single pattern of animal life. When one has become, by long study of Nature, in some sense intimate with the animal creation, it is impossible not to recognize in it the immediate action of thought, and even to specialize the intellectual faculties it reveals. It speaks of an infinite power of combination and analysis, of reminiscence and prophecy, of that which has been in eternal harmony with that which is to be; and while we stand in reverence before the grandeur of the Creative Conception as a whole, there breaks from it such lightness of fancy, such richness of invention, such variety and vividness of color, nay, even the ripple of mirthfulness—for Nature has its humorous side also—that we lose our grasp of its completeness in wonder at its details, and our sense of its unity is clouded by its marvelous fertility. There may seem to be an irreverence in thus characterizing the Creative Thought by epithets which we derive from the exercise of our own mental faculties; but it is nevertheless true, that, the nearer we come to Nature, the more does it seem to us that all our intellectual endowments are merely the echo of the Almighty Mind, and that the eternal archetypes of all manifestations of thought in man are found in the Creation of which he is the crowning work.

In no group of the animal kingdom is the fertility of invention more striking than in the Crinoids. They seem like the productions of one who handles his work with an infinite ease and delight, taking pleasure in presenting the same thought under a thousand different aspects. Some new cut of the plates, some slight change in their relative position is constantly varying their outlines, from a close cup to an open crown, from the long pear-shaped oval of the calyx in some to its circular or square or pentagonal form in others. An angle that is simple in one projects by a fold of the surface and becomes a flutid column in another; a plate that was smooth but now has here a symmetrical figure upon it drawn in beaded lines; the stem which is perfectly unbroken in one, except by the transverse divisions common to them all, in the next puts out feathery plumes at every such transverse break. In some the plates of the stem are all rigid and firmly soldered together; in others they are articulated upon each other in such a manner as to give it the greatest flexibility, and allow the seeming flower to wave and bend upon its stalk. It would require an endless number of illustrations to give even a faint idea of the variety of these fossil Crinoids. There is no change that the fancy can suggest within the limits of the same structure that does not find expression among them. Since I have become intimate with their wonderful complications, I have sometimes amused myself with anticipating some new variation of the theme, by the introduction of some undescribed structural complication, and then seeking for it among the specimens at my command, and I have never failed to find it in one or other of these ever-changing forms.

And now let me ask—is it my ingenuity that has imposed upon these structures the conclusion I have drawn from them?—have I so combined them in my thought that they have become to me a plastic form, out of which I draw a crinoid, an ophiuran, a star fish, a sea-urchin, or a holothurian at will? or is this structural idea inherent in them all, so that every observer who has a true insight into their organization must find it written there? Had our scientific results anything to do with our invention, every naturalist's conclusions would be colored by his individual opinions; but when we find all naturalists converging more and more toward each other, arriving as their knowledge increases, at exactly the same views, then we must believe that these structures are the Creative ideas in living reality. In other words, so far as there is truth in them, our systems are what they are, not because Aristotle, Linnæus, Cuvier, or all the men who ever studied Nature, have so thought and so expressed their thought, but because God so thought and so expressed His thought in material forms when He laid the plan of Creation, and when man himself existed only in the intellectual conception of his maker.

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THE MOST COMMON FAULT IN SCHOOL BOOKS.

We very frequently receive new school books for examination, and take them up with a disposition to give them a friendly notice, but in nine cases out of ten meet with something on the first page that determines our decision against them. The feature that is so common, and that we regard as so objectionable, is a series of unintelligible definitions, definitions that are unintelligible, at least, to minds that are not familiar with the subject which the book is designed to teach. For instance, we have now on our table a pile of school books by Horatio N. Robinson LL. D., and we take up one entitled "The Rudiments of Written Arithmetic," when we find the first chapter headed Definitions, and commencing thus,

1. "Quantity is anything that can be increased, diminished, or measured; as distance, space, weight, motion, time.

2. A Unit is one, a single thing, or a definite quantity.

3. A Number is a unit, or a collection of units.

4. An Abstract Number is a number used without reference to any particular thing or quantity; as 3, 24, 756."

We have no fault to find with these definitions whenever they are in a proper place. The objection that we make is to their position on the first page of a work designed to teach the rudiments of arithmetic. To a child, having no knowledge of arithmetic, these words convey no meaning whatever. To lead his mind to a knowledge of the study, it would be just as profitable to teach him to repeat *abracadabra*, or any other unmeaning sound. We remember perfectly well the time when we could recite "Murray's Grammer" verbatim from beginning to end, and not a sentence in it conveyed any clear idea to our mind. When we repeated the definition of a verb, "A verb is a word which signifies to be, to do, or to suffer," a confused notion was excited that we were talking in a vague way about physical pain; and we believe this is a fair sample of the effect produced by those learned and abstruse definitions with which it is so fashionable to commence school books.

A few men have undertaken that most delicate and difficult task, the writing of school books, who had that instinctive perception of the powers and requirements of a child's mind which is the most essential requisite for the undertaking. The most illustrious of these is Warren Colburn, whose mode of commencing his arithmetic forms, in our judgment, a model for all school books:—

"How many thumbs have you on your right hand?

"How many on your left?

"How many on both?

"One and one are how many?"

Proceeding from the concrete to the abstract; letting the particular come before the general; and reserving the definitions to the close of the study, when only can they be made intelligible. "Smiths Grammar" displays in its author the same instinctive faculty for teaching, and we presume that there are many other school books free from the objection that we have been considering. We regard this objection as one of considerable importance. It is natural for the human mind to desire knowledge, and if studies are presented at the right age and in the right way, children are always pleased with them. But when a child is set to study an abstruse definition which he cannot understand, the task is exceedingly irksome, and he is disgusted with the study at its very commencement. It is by tasks of this sort that children are turned from the pleasures of learning, and are led to neglect their studies, to play truant, and to create all of the disorders that prevail in schools.

Canadian Patent Office.

N. F. Belleau, the Minister of Agriculture in Canada, in his report on agriculture and statistics, gives the following respecting the business of the Canadian Patent Office:—

The business of the Patent Office is steadily increasing. During the past year, the fees received for Patents of Invention amounted to $3,020, those for assignments, copies of specifications and registration of Trade Marks to $194 30, amounting together to the sum of $3,214, which has been paid to the credit of the Honorable the Receiver General. This department of the Bureau has now become self-supporting.

The Royal Patent Commissioners in London, continue to present to the Bureau the specifications and engravings of patents issued in the United Kingdom. They now amount to 500 volumes.

Since the removal of the Government to Quebec, 443 models have been received by the Patent Office.

It is much to be regretted that want of accommodation has hitherto deprived the public in a great measure of the advantages which they would otherwise derive from the museum of models and valuable library of books. The models should be classified, numbered, arranged, and a descriptive catalogue should be prepared. The room might then be open to the public, say daily during the session of Parliament, and perhaps twice or thrice a week during the remainder of the year.

[The advantages to the people of Canada, and the income and efficiency of their Patent Office would be greatly increased if the right of obtaining patents were opened to the citizens of all nations.—EDS.

RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list on another page:—

Cane Stripper.—This invention consists in the employment of a series of cutters or strippers constructed and arranged in a frame in such a manner that they will be capable of adjusting themselves to suit cane of different thickness, and also to suit the varying thickness or taper of each individual stick or cane, as the latter is drawn through or between them and the leaves stripped therefrom. The inventors are Messrs. B. Haworth and E. Haworth, of Ridge Farm, Ill.

Iron-Built and Iron-Clad Vessels.—This invention consists in constructing a vessel of frames of iron and interposed frames of wood, and in covering the said frame with two or more series of flat diagonal bars crossing each other in opposite directions, and an outer series of longitudinal plates, the whole being bolted together and combining to make a very strong vessel, capable, in a very high degree, of resisting the impact of heavy projectiles. Its ports are made with angular or V-shaped faces, that the projectiles may glance off in striking. Between the portholes there are constructed heavy wooden buttresses, which make the ports like the embrasures of forts. W. Ballard, of New York city, is the inventor.

Grain and Grass Harvesters.—This invention relates, first, to a novel and improved means employed for operating the sickle, whereby the desired end is attained with but few parts and in a very direct manner, and the device admitting of being readily thrown in and out of gear so as to render the sickle operative or inoperative whenever desired. Second, in a novel arrangement of the main frame of the machine with the sickle, having mechanism whereby the main frame and sickle are allowed to move or work independently of each other on the same axle, and the sickle allowed to conform perfectly to the inequalities of the ground over which it passes without being in the least affected by any swinging movement of the main frame. B. H. Smith and G. W. Archer, of Ipswich, Conn., are the inventors.

Cartridge.—The object of this invention is to obviate the necessity of biting or tearing the cartridge before its insertion into the gun and prevent the waste of powder which is almost unavoidable in opening the cartridge before loading; to this end the invention consists in fitting the cartridge with a loose bottom which is driven into the body by the act of ramming the cartridge down upon or against the breech of the gun, and so caused to contract circumferentially and allow loose powder to escape and come in contact with the breech and insure its ignition. J. C. Mayberry, of White Rock, Ill., is the inventor.

Shrinking Tires.—The object of this invention is to obtain an implement by which the tires of wheels may be shrunk or contracted so as to fit the wheels to which they are to be applied without being cut and rewelded, one which will admit of the tires being readily applied to and removed from it, and at the same time hold the ties firmly in position so that they cannot casually move nor sag down while being operated upon. George McKown, of Altona, Ill., is the inventor.

ISSUED FROM THE UNITED STATES PATENT OFFICE.

FOR THE WEEK ENDING JUNE 24, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

35,660.—H. F. Adams and William Berry, of Syracuse, N. Y., for Improvement in Kerosene Lamp Burners:

We claim the combination of the large concave flange, F, and conical air chamber, A, having bottom openings as described, with the small concave flange, R, inclosed within the cap, C, and said flange, R, being constructed with peculiarly-formed center and outside openings as specified, and the whole being combined and arranged, specifically as described, and for the purposes set forth.

35,661.—John Allen and Edward Pick, of Brooklyn, N. Y., for Improvement in Ovens:

We claim, first, The draught and steam flue opening from the mouth of the oven, when combined with a baking chamber suitable for, and containing the reel apparatus and bake-pans, substantially as described.

Second, The side draught flues, in combination with the baking chamber of a reel oven, when opening below the mouth of the oven and above the floor, substantially as described.

Third, The double series of horizontal heating flues, in combination with the furnace and floor of a reel oven, constructed and arranged substantially as described.

35,662.—George Archer, of Massillon, Ohio, for Improvement in Combined Hounds and Fifth Wheel:

I claim the described special construction and arrangement of the hounds and fifth wheel, when combined and operating conjointly, as specified.

35,663.—S. A. Bailey, of New London, Conn., for Improved Rollers for Wringing Machines:

I claim, first, The employment of the wooden or metal cylinder, B, constructed in the manner and used for the purpose specified.

Second, The use of the rubber packing between the slats of the cylinder and the shaft, A, for the purpose of supporting said slats, as is fully set forth.

Third, Connecting the external rubber with the rubber between the slats and the shaft, through the interstices or openings in the cylinder, substantially as and for the purpose specified.

35,664.—James R. Baker, of Kendallville, Ind., for Improved Mode of Removing Chimneys and Filling Lamps:

I claim the attaching of the annular plate, D, which has the cone or deflector, E, and draught chimney secured to it, to a sliding tube, C, fitted in the burner, A, and provided with a hole or opening, b, substantially as shown, to serve the double purpose of a guide and filling tube, and admit, by the raising of the tube, the wick being lighted and the lamp filled, without detaching the chimney from the burner, or the burner from the lamp, as set forth.

35,665.—William Ballard, of New York City, for Improved Metallic Defensive Armor for Ships:

I claim the combination of iron frames, A A, interposed wooden frames, B B, longitudinal covering bars or plates, C C, reversed diagonal bars or plates, D D, and E E, and covering plates, F F, substantially as and for the purpose specified.

35,666.—James Beck, of New York City, for Improvement in Pliers for Closing Skirt Clasps:

I claim the combination in the pliers of the flat male die, a, and the concave rounded female die, b, substantially as specified.

Second, The arrangement of the dies obliquely to the length of the pliers, substantially as and for the purpose set forth.

[This invention consists in fitting the jaws of a pair of pliers with a flat male die and a concave rounded female die, by which means, in closing a metallic skirt clasp upon the hoop, the lips of the clasp are brought tighter upon the hoop than by pliers having dies or faces of other form. It also consists in the arrangement of the dies in an oblique position relatively to the length of the pliers, for the purpose of enabling both the hoops and tapes to pass the jaws in the operation of closing the clasps.]

35,667.—Solomon E. Blake, of Worcester, Mass., for Improvement in Folding and Tucking Gages for Sewing Machines:

I claim the apparatus described as an attachment to a sewing machine, for automatically folding or plaiting the material to be sewed, the same consisting of the following elements combined:

First, An adjustable gage for the determination of the distances from fold to fold, and by which the material to be folded and sewed, is guided to the sewing mechanism as described.

Second, Two folding blades, either or both of which are movable within planes parallel, so as to allow of their adjustment in relation to each other, and in relation to the gage, as described.

Third, Rollers so hung on spindles fixed to or in folding blades as that the edge of said folding blades shall impinge upon the said rollers, substantially as described.

35,668.—A. B. Cass, of Muscatine, Iowa, for Improvement in Cultivators:

I claim the pivoted share standards, a* a*, and sliding share standards, g g, connected to the jointed adjustable lever, E, in combination with the seat, H, and lever, F, connected to a lever, E′, and the seat support, I, all arranged as and for the purpose specified.

[The object of this invention is to obtain a corn plow or cultivator, which will admit of having its plows shifted or moved by the driver on his seat, so that the plows may be adjusted with the greatest facility to conform to the sinuosity of the rows, and, at the same time, admit of being readily raised above the surface of the ground when it is desired to have the implement inoperative.]

35,669.—N. B. Clabaugh, of Frederick City, Md., for Improved Washing Machine:

First, I claim a rubbing cylinder, B, armed with eccentric rubbers, C, in the manner and for the purpose set forth.

Second, I claim a rubbing board, H, having its rubbing plates, H′, formed with a series of ribs, h1 h2 h3 and h4, of increasing hight, in the manner and for the purpose specified.

Third, I claim a rubbing cylinder, B, in combination with a rubbing board, H, substantially in the manner and for the purpose set forth.

35,670.—J. D. Cochrane, of Milford, N. H., for Improved Clothes Wringer:

I claim an improved clothes wringer, the various parts of which are constructed, combined and arranged to operate in relation to each other, substantially as shown and described.

35,671.—E. M. Corbett, of New York City, for Camera Stand:

I claim, first, The arrangement of the diagonal frames, E E′, connected together by pivots, a, on the principle of lazy tongs, in combination with slides, f g, and with the movable platform, B, and stationary top, C, the latter being supported by three legs, D, substantially in the manner and for the purpose shown and described.

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Second, The employment of the wedge-shaped hinge slide, H, guided by grooves, O, in the side flanges, n, of the platform, B, as and for the purpose specified.

[This invention consists in the arrangement of two diagonal frames, connected together on the principle of lazy tongs, and hinged at their opposite ends to the rising and falling platform, which supports the Camera, and to the stationary top of the stand in combination with slides, which permit said diagonal frames to adjust themselves according to their higher or lower position, in such a manner that the platform with the Camera can be raised or lowered in parallel planes, and that the same is supported perfectly firm and steady, in front and rear, in whatever position it may be brought. It consists, also, in the employment or use of a wedge-shaped hinge slide, moving in grooves in the sides of the platform, for the purpose of adjusting the inclination of the camera.]

35,672.—Herbert Curtis and Alfred Tufts, of Charlestown, Mass., for Improvement in Sweat Leather Ventilators for Hats:

We claim, as our invention, the combination and arrangement, substantially as described, of a flexile annulus, or thin metallic hoop, a, and a series of springs, D, with the sweat band, B, and an air-ventilating space, C, the whole being for the purpose or purposes specified.

We also claim the combination of the secondary or holding hoop or annulus, b, with the series of springs, D, the flexile annulus, a, and the sweat band, B, to be applied within a hat body, and with a ventilating or air space, C, between such body and band, substantially as specified.

35,673.—R. D. Dodge, of Adel, Iowa, Improvement in Cultivators:

I claim the arrangement of the stirrups, b, connecting the front ends of the beams, G G′, in combination with the treadles, e, hand levers, k, and guide bars, m, all constructed and operating in the manner and for the purpose shown and described.

[The object of this invention is to connect the plows of a cultivator to each other, and to the main frame, so that each plow can accommodate itself to the inequalities of the ground, entirely independent of the other, and that a side motion can be imparted to the plows or to a portion of them, so that, in cultivating, both sides of a hill can be reached, as close to the plants as may be desired.]

35,674.—W. H. Doane, of Cincinnati, Ohio, for Improved Barrel Head Circling and Beveling Machine:

I claim, first, So arranging the feed or driving shaft and the pulleys thereon, relatively to the saw arbor frame, that the movement of the saw arbor frame will cause the belt to change from the fast to the loose pulley, and *vice versa*, and thus cause the saw to be put in operation by its movement to the work, and out of operation by the opposite movement of said frame, substantially as described.

Second, The manner of making the disk or clamp self-yielding on different parts of its clamping surface, by means of yielding pins or projections, so that it will adapt itself to pieces of heading of uneven thickness, and hold them firmly while being cut, substantially as described.

Third, The angular connection sliding bar, and slotted slide with prongs, operated with or without the foot lever, for drawing the prongs back out of the way, so that the heading may revolve when clamped and the feed started, and for producing a last motion, substantially as set forth.

Fourth, Making the lower half the box or bearing, l l′ l″, which supports the worm shaft on the inside of the structure, A, hollow, so that it may be filled with oil for the worm to run in, and arranged inside of the hollow pedestal, thus preventing friction and wear and ensuring lubrication, substantially as set forth.

Fifth, Arranging the heading-supporting prongs, as described, and also the gearing and shafting within the conical structure, entirely out of the way, and substantially as described.

Sixth, The combination of the inner beveling tools, j, of a heading machine, with the flattened wedge screw bolts, j′, and their nuts, substantially in the manner and for the purpose described.

35,675.—Edwin S. Gaylord, of Hartford, Conn., for Improvement in Mica Chimneys for Lamps:

I claim, as a new and improved article of manufacture, a mica chimney for lamps, &c. The combination of mica, a, from compression rings, c, and a lateral joint bar, b, or double-S clasp, b, substantially in the manner as and for the purpose described.

35,676.—Davis and Josiah Gray, of Wayland, N. Y., for Improvement in Axle Skeins:

I claim the combination of a hollow steel axle skein, constructed substantially as described, with the arm or reach clip; so constructed and arranged on the axle, as to grasp and compress the sides of the skein, and thus hold it firmly to the axle.

35,677.—James Greaves, of Utica, N. Y., for Improvement in Pumps:

I claim, first, Making the barrel, A, with the exterior enlargement, B, and valve seat, L, in one piece, the washer, D, as used in combination with the enlargement, B, and flange, C, the float valve, 2, water chamber, R, and small pipe, S, as constructed and combined with barrel, A, and pipe, 3, the lead lining, 4, or equivalent, fastening the flange, F, to the wood pipe, E, the combination of the flange, G, with the pump, H, the iron bottom, O O, as made and combined with the wood, H, the ornamental cap, I, as constructed and covered with the metal, P, the ventilator, No. 2, as constructed and combined with the pump, H, the plunger, No. 3, as constructed, the feet of the cross piece, 1, projecting in opposite directions, in line with the valve seat outer edge, and riveting it to said seat, the washer, 5, as fastened with the screws, 6 6, to the seat, 2.

Second, The rubber strips, 2 2 2 2, No. 4, or equivalent, as combined with the shaft, 1, and pump, 3, joint, 6, as constructed and combined with strip, O, and projection, 7, the guide 8, and its lining of leather or equivalent, all as and for the purpose described.

35,678.—Joseph Harrison, Jr., of Philadelphia, Pa., for Improved Device for Removing Incrustations from Steam Boilers:

I claim the combination of the tube, A, with the rod, B, and the bar, a, and the cutters, e and e, whereby the cutters which are to operate inside of a steam chamber, may be introduced through an opening of a smaller diameter than that of the chamber itself.

35,679.—M. Harter, of Independence, Iowa, for Improvement in Evaporating Saccharine Liquids:

First, I claim the arrangement of the secondary fire door, F, in the side of the flue, C, in combination with the damper, G, placed between the door, F, and the main fire door, D, and with the pans, A, B, all constructed and operating in the manner and for the purpose described.

Second, The employment or use of the rotary agitator, H, in combination with the evaporating pan, B, as specified.

Third, The arrangement of the convex cover, I, in combination with the pan, A, as and for the purpose set forth.

[The object of this invention is to arrange the several parts which constitute the evaporator, in such relation to each other and to the furnace, that one batch of juice or liquid can be completely finished before introducing some fresh juice.]

35,680.—B. and E. Haworth, of Ridge Farm, Ill., for Improvement in Sugar Cane Strippers:

We claim, first, The employment or use of cutters or strippers, formed of plates, c c′, the latter being allowed to yield or give under pressure, and both fitted in a suitable frame, A, one over the other, and curved at one end in semi-elliptical form, substantially as shown to operate as and for the purpose set forth.

Second, In combination with the strippers, B C, the supplemental or auxiliary strippers, E, applied to the frame, A, and arranged, substantially as shown to operate, in connection with the strippers, B C, as set forth.

Third, The manner as shown of securing in the frame, A, the plates, c c′, of the strippers, B C, and likewise the manner of attaching to said frame, the supplemental or auxiliary stripper, E, to wit: by having the plates, c c′, fitted in taper recesses, b, in the frame, so that the plates, c, may be fixed, and the plates, c′, allowed to yield or give under pressure, and the strippers, E, formed at the inner ends of the plates, D, which cover the recesses, b, whereby the strippers may be very readily applied to the frame, A, and detached therefrom, when necessary for the purpose of repairs, the substitution of new ones, &c., &c.

35,681.—V. W. Houck, of Buffalo, N. Y., for Improvement in Stave-Dressing Machines:

I claim, first, The adjustable and yielding guide stop, S, in combination with the guide feed rollers, E E′, for the purposes and substantially as described.

Second, The yielding guide piece, U, in combination with the cam W, for the purposes and substantially as set forth.

Third, The cam, P, in combination with the bar, P1, arm, P2, friction wheel, p4, and vibrating rod, p3, and rack shaft, O, for the purposes, and substantially as set forth.

Fourth, The curved bed plate, K, having flutes exactly corresponding to, and placed in line with those of the lower feed rollers, for the purposes, and substantially as described.

35,682.—Charles Howard, of Morris, N. Y., for Improved Washing Machine:

I claim the combination of disks, B B, on separate shafts, connected to the arms, D D, by means of the pitmen, F F, whereby both disks are moved in opposite directions, by one motion of the hand operating on the handle E as described.

35,683.—Mrs. Isabella J. H. Howard, of San Francisco, Cal., for Improvement in Abdominal Supporters:

I claim the arrangement of the comparatively hard and yielding pads, a a, and c c, the triangular spring, e, the strap, b, the pad, d, the elastic straps, g g, and h h, and the buckles, i i, and j j, substantially in the manner and for the purpose set forth.

35,684.—Charles A. Hunt, of Urbana, Ill., for Improved Clothes Dryer:

I claim the combination of the pedestal or slide bar, C, with the hinges, D E, and fingers, A, arranged and operating, substantially as and for the purpose specified.

35,685.—P. J. Jarre, of Paris, France, for Improvement in Repeating Fire Arms:

First, I claim the combination with the trigger, a, of the slide piece, b, when the latter is arranged in relation to the hammer and the breech bar, so as to actuate them to operate by the pulling of the trigger, in the manner and for the purpose set forth.

Second, In combination with the adjustable breech bar, constructed and operating as described, I claim the packing ring, r, when located between the breech bar and the rear part of the barrel, and when arranged, substantially in the manner and for the purposes set forth.

Third, I claim the construction and arrangement of the breech bar, the same consisting of a series of cartridge chambers, set in a slide frame, provided with suitable cams in combination with the movable rear plate, latch and other essential appurtenances as described.

35,686.—George B. Jewett, of Salem, Mass., for Improvement in Artificial Legs:

I claim, first, The rigid socket, A, in combination with the removable socket, C, operating in the manner, substantially as described.

Second, I claim connecting the socket with the foot, by means of the pedestal, E, having an adjustable connection with the socket, and being hinged to the foot as described, for the purpose specified.

35,687.—Algernon K. Johnston and Lorenze Dow, of New York City, for Improvement in Rendering Cartridges Water Proof:

We claim the application of the said substances and solutions, or any of them, collodion, &c., to the envelope of a cartridge for the purpose of water proofing the same, substantially as above described.

35,688.—B. F. Joslyn, of Stonington, Conn., for Improvement in Breech-Loading Firearms:

I claim the curved wedge-formed projection, x, combined with, and arranged on the movable breech, B, substantially as and for the purpose set forth.

35,689.—Elijah Kemper, of Thorn Township, Ohio, for Improvement in Gates:

I claim, first, The combination with a sliding gate of the hinged or pivoted piece, 2 2, the parts being arranged in such a manner as to operate as set forth, and secure the advantages stated.

Second, The combination with a sliding and hinged gate, as above described of a sliding latch, 12, substantially as and for the purposes set forth.

35,690.—Nehemiah Kimball, of Pascoag, R. I., for Improved Self-Setting Head Block for Saw Mills:

I claim the combination and arrangement of dog, F, carriage, E with rack, I, pinion, J, shaft, K, ratchet, L, pawl, M, link, N, slide, P, bent lever, R, and stop pin, V, the whole being constructed to operate as described for the purpose set forth.

35,691.—J. H. Knickerbocker, of Philadelphia, Pa., for Improved Method of Securing Tubes in Tube Sheets:

I claim securing the flues, B, of boilers in the tube sheets, A, thereof by means of the ferrules, C, grooved at their exterior, tapered, and driven in the ends of the flues so as to cause the ends of the same to close around both edges of the holes, a, in the tube sheets, and admit of the flue being of equal diameter throughout, as set forth.

[This invention consists in the use of a ferrule having a concave outer surface of slightly tapered form, and of such diameter that it may be driven into the flue and expand the end of the same in such a manner that it will close snugly around the hole made in the tube sheet to receive the flue, and form a tight and permanent connection of the flue to the tube sheet.]

35,692.—Henry Knight, of Jersey City, N. J., for Improvement in Machines for Molding Cement Pipe:

I claim, first, The combination of the table, B, movable platform, L, mold or flask, M, plate, K, core, I, and jack screw, G H, or its equivalent, the whole constructed and arranged, and operating substantially as and for the purposes described.

Second, The combination of the wheeled truck, L, and railway bars, F F, with a cement pipe molding machine, substantially in the manner and for the purpose described.

Third, The combination of the pliable washer with the hard shoulder of the core, substantially as described and for the purpose set forth.

Fourth, The construction of the plate, K, with flaps, d d, and with apertures of different diameters, substantially as and for the purpose described.

Fifth, The manner of arranging the guides, a, and the short posts, E E, with the rack bar, G, and core, I, for the purpose set forth.

Sixth, The connection of the shoulder or collar, J, to the core, I, by means of an adjustable through pin, b, in the manner and for the purpose described.

Seventh, The lifting of the base plate, K, and the flask or mold above the truck platform by means of the ends of the pin, b, or an equivalent means, substantially as described.

35,693.—Henry Kühne, of Racine, Wis., for Improved Steering and Propelling Apparatus:

I claim the combination of the screw propeller, F, arranged in the rudder, and having adjustable blades, the capstan, K, shafts, L J, gearing, M N I G H, and lever, S, the whole applied and arranged substantially as set forth.

[The object of this invention is to enable sailing vessels to enter harbors without the aid of towboats, and to provide for the more effective steering of such vessels in intricate channels, and in all waters where the navigation is difficult, and to this end it consists in the employment for propelling, and as an aid in steering; of a screw propeller arranged in the rudder, and worked through the intervention of suitable gearing by a capstan on board the vessel. It also consists in employment, in combination with movable blades pivoted to such screw propeller, of means by which the said blades can be adjusted from on board the vessel, to set them at a suitable angle to the plane of the rudder for propelling or steering, or bring them to a position parallel with the plane of the rudder, when it is not desired to use the propeller, that they may offer the least possible obstruction to the progress of the vessel.]

35,694.—E. B. and J. S. Lake, of Absecom, N. J., for Improvement in Circuit Closers for Telegraphs:

We claim the circuit closer, D, combined with the telegraph key, C, substantially as set forth.

35,695.—J. W. Lawson, of Ann Arbor, Mich., for Improvement in Machines for Upsetting Tires:

I claim the combination and arrangement of the sliding bed and stationary bed, stationary jaws and sliding jaws, wedge-shape keys, cam and lever, substantially as set forth and described, and for the purpose specified.

35,696.—G. W. Lloyd, of Detroit, Mich., for Improved Mode of Constructing and Arranging Foot Lights for Theaters:

I claim the position and mode of arrangement of the lights with the continuous reflector as distinguished from the mode now ordinarily in use.

I claim also the power of throwing colored lights on the stage, as above described.

And I claim by means of the guard formed by the sunken trough, and the wire cloth covering greatly increased safety to performers.

35,697.—W. R. Manley, of New York City, for Improved Feathering Paddle Wheel:

I claim making the length of the arm or crank, 6, so proportionate to the distance which the horizontal center of the axis is from the horizontal center of the bucket, that the center of the journal bearing in the outboard bucket flange, and the center of the journal bearing in the feathering flange, are equidistant from a straight line projected indefinitely, from the center of the journal bearing in the inboard bucket flange, through the center of the bucket, as has been described and as is represented in figure 3.

35,698.—Richard Martin, of Brooklyn, N. Y., for Improved Packing for Piston and Valve Rods:

I claim the packing ring composed of a folded strip of woven hemp with a lining of wire gauze, the whole being constructed substantially as and for the purpose set forth.

35,699.—J. C. Mayberry, of White Rock, Ill., for Improvement in Cartridges:

I claim the construction of a cartridge with a loose contractible bottom, B, and a central peg, d, or its equivalent, applied and operating substantially as and for the purpose specified.

35,700.—H. W. Oliver, of New Haven, Conn., for Improvement in Kilns for Drying Lumber:

I claim providing a kiln with steam chambers, D D, separated from the drying chamber or central portion of the kiln by means of perforated or reticulated and wadded partitions, and applying heat below the lumber to operate in conjunction with the steam admitted through the said partitions, substantially as specified.

[This invention consists in certain provisions within a kiln for subjecting the lumber to heat in an atmosphere of steam, whereby the sap is extracted very thoroughly, and the lumber dried in a very superior manner in a short time.]

35,701.—J. J. Palmer and A. Plamondon, of Chicago, Ill., for Improvement in Grain Separators:

We claim the inclined screens, I, and chutes, J, placed in a suitable shoe, B, in combination with a blast spout, H, provided with openings, d, arranged relatively with the screens to operate as and for the purpose set forth.

We further claim the extension of the upper end of the inner side, i, of the shoe, B, above the discharge orifice of the hopper, L, substantially as shown, so as to have a moving surface at one side of the discharging orifice of the hopper, and a stationary surface at the opposite side, for the purpose specified.

[This invention consists in the employment of a series of inclined screens and chutes, placed within a suitable shoe, and arranged with a blast spout in such a manner, that the grain is made to pass consecutively over the screens, and subjected to a blast in passing over each one of them, thereby rendering the separation of foreign substances from the grain far more thorough than it otherwise would be.]

35,702.—Leonard Parker, of Winterset, Iowa, for Improvement in Straw Cutters:

I claim the use of the side knives, m and n, when used in combination with the knives, l and k, spring bottom, p, and the spiral spring, o, as described and represented.

35,703.—S. P. Parmelee, of New Haven, Conn., for Improvement in Pianofortes:

I claim constructing the wrist pin plate of the metallic string frame with a metallic projection, G, to receive and support each of the straining pin bushings, in manner as specified.

I also claim making each of the bushing sockets with an opening, h, extending out of its bottom, and with respect to the bushing, as set forth.

I also claim arranging the string holes or passages through the bridge, and directly underneath the junctions of each of the braces and the bridge, in combination with arranging the hitch pin of the string underneath the bridge, all substantially as described.

I also claim the arrangement or combination of the arched bridge with the socket plate and each of the braces, in manner substantially as described, the bridge thereby serving to connect the brace and the plate.

I also claim insulating each straining pin from the iron frame by means of a wooden bushing, or its equivalent.

35,704.—S. T. Parmelee, of New Haven, Conn., for Improvement in Pianofortes:

I claim constructing the iron or string frame with the metallic bracket or standard, B, for connecting the iron frame with bottom frame, as specified.

I also claim supporting the iron frame on the bottom frame, and insulating the former as described from the sounding board, and those parts of the case which extend above the bottom frame.

I also claim the above-described arrangement of the top plate, each of the braces, the bridge and the wrist pin plate of the iron frame.

I also claim arranging the iron frame bracket or supporter, with respect to the iron frame and the sounding board, in manner so as to pass down through the hammer openings of the sounding board, as described.

I also claim extending the sounding board across the entire interior of the case, viz., from side to side, and end to end thereof, and making such board with a passage for the hammers and the frame socket, as described.

35,705.—Thomas Pool, of Brunswick, Ohio, for Improveed Clothes Wringer:

I claim the combination and arrangement of the spring or springs, M N, sliding bearing blocks, P P Q Q, having guide slots and bearings, d d g g, and stationary guide screws or pins, f f, applied to the rollers, substantially as and for the purposes specified.

I also claim giving an equal or nearly equal, elastic pressure to both rollers simultaneously by means of the double long springs, M N, arranged in combination with the slotted frame, substantially as and for the purposes set forth.

35,706.—Mary Jane Pulte, of Cincinnati, Ohio, for Improved Composition for Cleaning Gloves:

I claim the within-described composition of matter for cleaning kid gloves, combined in the proportions and in the manner, substantially as set forth.

35,707.—W. H. Richards, of Newton, Mass., for Improvement in Head Cushions to Prevent Sun Stroke:

I claim a head protective cushion, made and to be used, substantially in manner and for the purpose specified.

35,708.—Gelston Sanford, of New York City, for Improvement in Machinery for Separating Fibers from Plants:

I claim the combination of the cylinder armed, substantially as described, with bars formed for scraping and combing or either, with the endless belt, also armed, substantially as described, with bars for scraping and combing or either, substantially as and for the purpose specified.

I also claim in combination with the cylinder and endless belt armed with bars, substantially as described, the covering of the periphery of the cylinder with elastic substance between the bars, that the teeth or edges of the bars may act against yielding surface, the better to perform the operations required, substantially as described.

I also claim the elastic griping feed mechanism, substantially as described, in combination with the mechanism, substantially such as described, which crushes the fiber-yielding plants, and separates the impurities from the fibers, substantially as described.

And I also claim arranging the two series of moving combs, so that the combs on one of the moving surfaces shall act in the spaces between the combs on the opposite moving surface, substantially as described, and this I claim, whether the two series of combs be attached to a belt and a cylinder, or to any other form of moving surfaces, so long as the said surfaces move at or nearly the same velocity.

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35,709.—Gelston Sanford, of New York City, for Improvement in Machinery for Dressing Flax and Hemp:

I claim the combination of the two series of breaking rollers, one series arranged on a cylinder, and the other on an endless belt, or on the equivalents thereof, the one series being driven and imparting motion to the other series, substantially as and for the purpose described.

I also claim the combination of the two series of hatchels arranged on the cylinder, and on the belt or endless apron, or the equivalents thereof, the one series being driven and imparting motion to the other series, substantially as and for the purpose described.

I also claim the two series of hatchels, in combination with the two series of breaking rollers, arranged on a cylinder and endless apron or belt, or their equivalents, when one of the said series of breaking rollers and hatchels is driven, and imparts motion to the other series, substantially as and for the purpose described.

And I also claim the feed rollers, one of which is elastic, in combination with the cylinder and belt or endless apron, or their equivalents, and provided with breaking rollers and hatchels or either, substantially as described.

35,710.—Gelston Sanford and J. E. Mallory, of New York City, for Improvement in Machinery for Breaking and Cleaning Hemp and Flax:

We claim in combination with reciprocating fluted surfaces for breaking and pounding, whether the flutes be made of equal or gradually less size, a reciprocating whipping or jarring rod, substantially as and for the purpose specified.

35,711.—S. M. Seley and Peter Hopkins, of Peoria, Ill., for Improved Piston for Steam Engines:

We claim admitting steam within the piston from one side, and preventing its escape on the other side, alternately by means of valves sliding on stationary longitudinal pins, and covering apertures in the respective plates or heads of the piston, substantially as and for the purpose set forth.

35,712.—B. H. Smith and G. W. Archer, of Ipswich, Mass., for Improvement in Harvesters:

We claim the combination of the rock shaft, S, finger bar, L, caster wheel, Y, and lifting lever, V, with the swinging bar, I, driving wheel, H, and frame, A, as shown and described, so that there will be a self-acting adjustment of the cutters as the machine passes along over the earth, and so that the cutters may at any be instantly lifted from the ground, all as specified.

The combination of the curved swinging arm, J, with the bar, I, and axle, B, as and for the purpose shown and described.

35,713.—J. D. Smith, of Peoria, Ill., for Improvement in Seed Planters:

I claim, first, The gage plate, G, and lever, H, arranged with the shaft, I, provided with the pin, h, and lever, M, substantially as shown to operate as and for the purpose set forth.

Second, The set screw, K, in connection with lever, H, gage plate, G, and spring, J, for the purpose of regulating the discharge of the seed, as specified.

Third, Attaching the furrow share bar, P, to the shaft, I, by means of the spring, O, as and for the purpose set forth.

[This invention consists in a novel and useful arrangement of a seed gage, levers, furrow share and certain other parts, whereby the seed gage is operated or adjusted alternately, from the movement of the lever, G, by which the furrow share is raised and lowered.]

35,714.—F. B. Stevens, of New York City, for Improved Method of Heating Feed Water for Steam Engines. Patented in England, October, 10, 1861:

I claim, first, The additional eduction valve communicating with the cylinder of a steam engine by an aperture placed at, or near the middle of the length of the cylinder, in combination with apparatus for heating the feed water of steam engines by steam withdrawn from the induction side of the piston, substantially as shown and described.

Second, Forming the aperture or nozzle last named by a number of small holes, a a a, pierced through the middle of the cylinder, substantially as shown and described.

Third, Opening and closing the additional eduction valve when placed in the middle of the cylinder by a motion derived from the eccentric that works the main valves of the engine, substantially as shown and described.

Fourth, The diaphragm in the closed heater and the valve attached to the cup, or its equivalent, and balanced by the weight in combination with apparatus for heating the feed water of steam engines by steam withdrawn from the induction side of the piston.

35,715.—J. A. Thayer, of East Boston, Mass., for Improvement in Tools:

I claim, first, A shank or bar graduated to form a scale, the ends of which are shaped respectively into a screwdriver and claw, as described.

Second, A handle or sleeve capable of adjustment upon and along the said shank or bar, substantially as set forth.

Third, A hammer head adjustable along the said shank or scale and provided with a bulging center piece so arranged as to act as the fulcrum to its own claw as well as to that of the bar, the whole being constructed, arranged and combined as set forth.

35,716.—J. D. Tifft, of Cuyahoga Falls, Ohio, for Improvement in Clothes Wringer and Mangle Combined:

I claim the eccentric fulcrum, P, arms, m′ n′, wedges, m n, bearings, c d, in combination with the elastic springs, G, rollers, C C′ and D D′, in the manner described, when operating conjointly for the purpose set forth.

35,717.—Benjamin Tukey, of Fairfield, Maine, for Improved Fruit Gatherer:

I claim the method of gathering fruit described, without danger of bruising the fruit, and without ascending the trees, using for the purpose the instrument described, or any other substantially the same.

35,718.—C. A. Uhl, of Millersburgh, Ohio, for Improvement in Cultivators:

I claim, first, The arrangement of the lever, L, rods, m, beam, I, and plows, E, as described, for the purpose of lifting the plows from the earth, as described.

Second, The guides, F, for regulating the depth of the furrows in combination with the pins inserted in the holes, f, in the said guide bands, F, substantially as described and shown.

35,719.—Joseph Vendrand, of Paris, France, for Improvement in Planes. Patented in England March 4, 1861:

I claim, first, The combination with the plane iron, A, provided with mortises, R, as described, of the adjusting screw, V, sliding block, B, and tenon, a, the said tenon and mortise being relatively so constructed as to allow the iron sufficient lateral play to permit the perfect adjustment of the edge parallel to the face of the plane, as set forth.

Second, The combination of the nut, a′, which secures the cap to the cutting iron, with the lever, E, and ears, E′ E′, as and for the purpose set forth.

Third, The arrangement of the lever, E, and screw, e, as described, that is to say, in such a manner that the screw shall take its point of support upon the top of the plane and extending up through the nut, E2, terminate in a head for operating above the lever, E, as set forth, instead of behind it, where it would be in the way of the operator.

35,720.—Charles Wanzer, of New York City, for Improved Cement for Slate Roofing:

I claim a combination of grease pitch with the quicklime or hydrate of lime, or the chloride of lime or bleaching powder, venetian red, or other ocher, and linseed, or other oil, about in the proportions specified, to form a cement, for the purpose set forth.

[This cement is designed for slate roofing of that class in which the slabs are laid without a lap, the ends simply abutting against each other as well as the sides. The object of the invention is to obtain a cement which will be impervious to water, insoluble, and at the same time not harden by age so as to be liable to crack and shell off from the surface to which it is applied.]

35,721.—P. L. Weimer, of Lebanon, Pa., for Forming Molds for Shot and Shells:

I claim, first, Rotating the flask which receives the sand composing the mold, while the sand is supplied to the flask and is being compacted by one or more rollers, for the purpose set forth.

Second, I claim forming the cavity in the mold within which the shot or shell is to be cast by means of a rotating reamer.

Third, I claim a rotating polisher for finishing the cavity formed by the reamer, for the purpose set forth.

35,722.—W. H. Wellsteed, of Buffalo, N. Y., for Improvement in Skates:

I claim the jointed toe, D, of the runner, spring, E, and a suitable pressure spring or pad, F, in connection with the screw, C, or other proper heel fastening, substantially as and for the purpose set forth.

[This invention relates to a novel way of attaching the skate to the foot, whereby the use of straps is entirely avoided and much time saved in adjusting the skate to the foot, and the latter prevented from becoming cold and cramped, as is the case when straps are used for the purpose.]

35,723.—T. E. M. White, of New Bedford, Mass,, for Improvement in Artificial Legs:

First, I claim a perfectly ventilated and pliable socket constructed of steel braces covered with canvas, and surrounded by wire gauze, as described.

Second, A ratchet and catch in the knee joint, as set forth.

Third, A lever for bringing the catch in contact with the ratchet by means of the weight of the body, and liberating it, as specified.

35,724.—Dutee Wilcox, of Providence, R. I., for Improvement in Sleeve Fasteners:

I claim my improved sleeve catchup or fastener as made with the duplex hooked spring tongue, B, and with the guard hook, C, constructed, arranged and applied to the body part, A, in manner and so as to operate, substantially as specified.

35,725.—Fenn Willcox, of Newark, N. J., for Improvement in Gig Sawing Machines:

I claim, first, The frame, D, constructed as shown, in connection with the plate, S, attached to said frame, D, by hooks, k, as and for the purpose set forth.

Second, The adjustable plate, R, connected by a hinge or joint, j, to the plate, S, and operated by a set screw, n*, for the purpose of regulating the rake of the saw, as set forth.

Third, Connecting the frame, D, to the shaft, G, by means of the strap, E, and pulley, F, the latter being connected to its shaft, G, by the clutch, H, to admit of the adjustment of the frame, D, as described.

Fourth, The combination and arrangement of the gearing, I J, and spring, L, for the purpose of straining the saw, N, as set forth.

Fifth, The roller, C′, when placed in the adjustable plate, B′, and attached to the vertically-adjustable plate, D′, as and for the purpose set forth.

35,726.—R. P. Wilson, of New York City, for Improved Clothes Wringer:

The combination of the rollers, C C′, pulleys, E E F F, and endless india rubber belts, G G, arranged and applied to an upright framing, substantially as and for the purpose set forth.

[This invention relates to an improvement in that class of clothes-wringing machines in which pressure rollers are employed to effect the result. It consists in a novel application of springs to the rollers for the purpose of obtaining the necessary pressure, the springs being endless india-rubber belts fitted on loose pulleys placed on the journals of the rollers, whereby the desired pressure is obtained and the rollers allowed to rotate with the least possible degree of friction, the belts, when stretched or distended to a certain extent, being permitted to move under the action of the rollers.]

35,727.—A. I. Ambler (assignor to himself, R. N. Ambler and Warrick Martin), of Milwaukee, Wis., for Improvement in Railroad Car Brakes:

I claim, first, The rotating rod or shaft, C, in connection with one or more cams, D, either placed on the rod or shaft, or so connected therewith as to be turned by it and actuate the brakes, as described.

Second, Operating or turning the rod or shaft, C, from the locomotive by means of a steam cylinder, J, having its piston rod, K, provided with a rack, L, which gears into a pinion, M, on the shaft, N, connected with the rod or shaft, C, substantially as set forth.

Third, The shafts, P S, fitted one within the other and connected, one, P, to the rod or shaft, C, and the other, S, directly to the brake bars, substantially as and for the purpose specified.

Fourth, The draw heads or couplings formed of the crossbars, f, each provided with a pin, g, and a hole, h, substantially as set forth.

[This invention consists in the employment of a rotary rod or shaft placed underneath each car and provided with cams so arranged as to actuate the brakes. The invention also consists in a novel and improved way of applying steam power to the brakes as well as to an improved arrangement for operating them by hand, and also to an improved mode of connecting or coupling the cam rods or shafts.]

35,728.—I. S. Barber (assignor to himself and L. N. Fuller), of New York City, for Improvement in Cigar Machines:

I claim, first, The combination of the concave rollers, A and A′, and the roller, L, whether of wood or metal, with the endless belt, M, and desk, O, when combined and used for the purpose of manufacturing cigars, in the manner described.

Second, Also, in combination with the foregoing first claim, the loose sleeve, D, header, J, circular knife, H, and circular die, I, the same being constructed and acting together to perfect the operation of the manufacture of cigars, as and in the manner described.

35,729.—H. V. Butler, of New York City, and J. C. Hoadley, of Lawrence, Mass., assignor to said H. V. Butler, for Improvement in Device for Changing Speed in Machinery:

We claim the combination of the collar, E, its attached pinion, F, and the pulleys, T M, with the shaft, D, pulley, P, clutch, K, gears, G I J, and belt shipper, Q, in the manner and for the purpose shown and described.

[The object of this invention is to obtain a device by which the speed of machinery may be chained at will and very expeditiously, without any cessation of movement. The invention will be found a great acquisition applied to machinery which requires to have its speed changed during its operation from fast to slow and *vice versa*, in order to favor the manufacture of certain articles, as for instance, machinery for manufacturing paper, printing calico, &c.]

35,730.—Z. E. Coffin, of Newton Center, Mass., assignor to himself and W. P. Hunt, of Boston, Mass., for Improved Capstan:

I claim the arrangement of the hollow shaft, C, within the capstan barrel and upon the fixed spindle, B, said hollow shaft being arranged to carry the gears, Q, above, and the pawls, G, upon an expanded rim at the bottom, and so as to freely turn upon the fixed spindle for the simple motion, but becoming stationary when the gears are brought into action by reversing the motion of the lever head, substantially as and for the purposes set forth.

35,731.—Samuel French, of Boston, Mass., assignor to himself and Sidney Allen, of Newton, Mass., for Improvement in Safety Pockets:

I claim the combination of the flexible arm and bolt actuator, or their equivalent or equivalents, with the pocket and its fastening apparatus, the whole being substantially as specified.

35,732.—W. Froehlich, of Harburg, Kingdom of Hanover, assignor to Morris Richter, of New York City, for Improved Mattress:

I claim a mattress having its cover or case divided into a series of compartments of tri-lateral form, by means of a partition of zig-zag form, stitched or otherwise secured alternately at about equal distances apart, to the top and bottom of the cover or case, substantially as shown and described.

[This invention consists in dividing the cover or case of the mattress into compartments of tri-lateral form running transversely across the cover or case, whereby several advantages are obtained over mattresses of ordinary construction.]

35,733.—John Gallagher (assignor to himself, Christopher Dorflinger, Anson Judson and Antoine Regan), of Brooklyn, N. Y., for Improvement in Lighting and Trimming Lamps:

I claim, first, Suspending the wick tube, C, by means of the journals, I I, or their equivalents and operating substantially as and for the purposes described.

Second, I claim the opening, B, with its door, D, for the purposes described and set forth.

35,734.—John Gault, of Boston, Mass., assignor to himself and W. V. Barkalow, of New York City, for Improvement in Chain Shot:

I claim an elongated chain shot divided transversely, when the two portions are united by dovetails, or their equivalents, substantially as described.

35,735.—Jesee Johnson, of New York City, assignor to himself and John Ward, Jr., of Brooklyn, N. Y., for Improved Ironing Table:

I claim the construction and use of an ironing table, with a tapering top, A, and with a central frame, B b, open at one end, as shown by M, to allow the slipping on of skirts and the like, supported laterally by folding legs, F F, which are capable of being folded into a line with the said frame, so as to form a novel table possessing the advantages set forth.

35,736.—Nelson Kidder (assignor to B. F. Linville), of Moscow, Iowa, for Improvement in Ditching Machine:

I claim the combination of the share, E, and adjustable expanding wings, I I, adjustable supporting wheel, H h, and rollers, O, all constructed and operating substantially as and for the purposes set forth.

35,737.—La Fayette Louis (assignor to G. A. Prince and Thomas Stephenson), of Buffalo, N. Y., for Improvement in Melodeons:

I claim the construction of a device which I name the "basso tenuto," and the use and combination thereof with a melodeon, organ or pianoforte, for the purposes and substantially as described.

35,738.—John North, of Middleton, Conn., assignor to W. H. and J. A. Daniel, S. and S. F. Appleton, of New York City, for Paper Folding Machine:

I claim, first, The combination of pressure rollers for holding the paper upon and in working contact with propelling rollers, with such propelling rollers and folding rollers, the latter folding and presenting paper which is then moved by the former, the combination being substantially such as specified.

Second, I claim propelling rollers and pressure rollers acting in combination, as described, in combination with wires or rods to support sheets of paper, the combination being substantially such as specified.

Third, I claim in combination with a pair of folding rollers, a pressure roller applied substantially as described, to compress paper against one of the folding rollers, the combination acting substantially as set forth.

Fourth, In combination with folding mechanism mounted upon a vibrating frame or vibrating arms, I claim a delivering board constructed, arranged and operating substantially in the manner described,

Fifth, I claim, in combination, a compresser or compressing surface, a delivering board, having a mode of operation substantially as described, a table or support for folded paper, and other surfaces parallel or nearly so to the compressing surface, which latter gradually move away from the compression as folded sheets are introduced, the whole being constructed and acting substantially as specified and in combination with a proper apparatus for folding paper.

Sixth, I claim, in combination with a delivering board a compresser acting substantially as described.

Seventh, I claim, in combination with proper blades or knives for creasing paper and introducing it between folding rollers, folding rollers fluted parallel to their axes operating upon the paper and in connection with the blades, substantially as set forth.

Eighth, I claim actuating the folding rollers of a paper-folding machine by means of stationary-toothed sectors, substantially such as described, when such rollers are mounted upon and carried by a counterpoised vibrating frame.

Ninth, I claim the general arrangement, substantially as described, in so far as the same consists of a stationary table on which the paper to be folded is laid, and a vibrating frame and of sets or series of folding rollers, mounted in that frame, under substantially such an arrangement of folding rollers and blades, as is described, whereby the paper is seized from the table and carried upward by the first pair of folding rollers and delivered from the frame on the opposite side thereof by the last pair of folding rollers.

Tenth, In combination with apparatus for folding paper, I claim a stop motion or disconnecting apparatus constructed and operating substantially as described.

Eleventh, I claim, in combination with folding rollers, a side guide for the edge of a sheet arranged and acting substantially as specified,

35,739.—Lewis Patric (assignor to himself and Henry Reed), of Victor, N. Y., for Improvement in Grain Separators:

I claim the arrangement, in grain separators, as and for the purpose specified, of the spout, p, and scraper, c, in combination with an inclined series of cylindrical concentric revolving screens, having a central blast passing through them longitudinally in the opposite direction from which the grain is fed.

35,740.—G. B. Phillips (assignor to John R. Crockett), of Newark, N. Y., for Improvement in Wrenches:

I claim the jam or holding nut, arranged substantially as described, for the purpose set forth.

I also claim the socket, L, in the head, A, in combination with the removable sockets of various sizes for screwdriver or other tools used in it.

35,741.—Cornelius Van Derzee (assignor to himself and W. S. Valentine), of Albany, N. Y., for Improvement in Bung Cutters:

I claim the combination and arrangement described of the following apparatus, forming a tool or machine for cutting out from suitable material bungs of any desired size, viz., mandrel A, fitted for rapid revolution, with its bar, B, the adjustable sliding blocks, C C, fitted as guides to the cutter bars, the cutter bars, E E, with their cutters and their guide bars, K and L, sliding cylinder, G, with its groove for the guide bars, the whole as set forth.

35,742.—James Webster (assignor to J. H. Porter and Robert Porter), of Birmingham, England, for Improvement in Manufacture of Oxygen Gas. Patented in England, Oct. 19, 1861:

I claim the obtaining the oxygen nitrogenous compounds, and the base of the salt employed in the manner stated.

RE-ISSUE.

1,319.—W. W. Shaw, of Troy, N. Y., assignor through Mesne Assignments, to L. L. Tower, of Cambridge, Mass., for Rubber Head for Lead Pencils, &c. Patented April 5, 1859:

I claim the combination of a lead pencil and an elastic rubber ferrule or head, made so as to encompass the cylindrical surface of the pencil or a tenon therefrom, substantially in manner as specified.

I also claim, as a new manufacture, an elastic erasive pencil head made substantially as described.

Books and Publications Received.

AMERICAN JOURNAL OF OPHTHALMOLOGY. Published by Balliere Brothers, 440 Broadway, New York City.

This is the title of a new monthly journal, devoted to the specialty of eye diseases and information relating to the eye. It is edited by Julius Homberger, M. D. Price $2 per annum. Diseases of the eye are very numerous. An ably-conducted periodical like this should obtain a large circulation.

THE ATLANTIC MONTHLY. Published by Messrs. Ticknor & Fields, Boston.

We have received the July number of the *Atlantic Monthly*. It is an excellent number. In "The Poet to His Readers" we think we discover the peculiar rhythm of Whittier; "Froude's Henry the Eighth" is ably reviewed, and the "Literary Notices" are admirably written. From Agassiz's article we give some extracts on another page.

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PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (exceptin cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

J. R., of Mich.—An article on the construction, arrangement and speed of bolts for milling, without referring to the questions of G. W. W., would be most instructive for our readers.

W. F. D., of Mass.—Graphite has been obtained in cast iron, but the iron itself cannot be converted into graphite, because the latter is simply carbon in a peculiar condition. The graphite which adheres to the interior of gas retorts, is of the same nature nearly as graphite plumbago.

G. M. H., of Me.—The case of variation of half an inch in the shrinkage of two similar castings of columns, from the same pattern and with the same kind of iron, must be due to the mode of casting, or the metal in the one case had been raised to a higher temperature than in the other case. Such variations of shrinkage are not uncommon.

I. N. G., of N. Y.—A solution of the chloride of soda will remove the odor from muskrat skins, but the operation will slightly injure the quality of the skin. To apply the chloride, steep the skins for about an hour in the liquid, of a strength equal to 1° Baume.

W. D. S., of Pa-—You will find the theory of the action of Giffard's Injector set forth on page 260, Vol. III. (new series) SCIENTIFIC AMERICAN. Your views accord with that theory.

T. O. B., of Ind.—There is no practical work published on dyeing that comes up to the practice of the present day. All logwood blues dyed on cotton are fugitive. They are prepared with a mordant of pyroligneous acid, and topped with strong logwood liquor.

W. M., Jr., of Pa.—French pistols are frequently made with the same acute grooves as those shown in your sketch, and they have been proposed to us for muskets several times within the past year. Grooved friction wheels are coming into common use as substitutes for toothed gearing. Your paper is sent regularly from this office.

J. S. B., of N. Y.—You can manufacture any of the machines for which you own the patent right of Monroe county, but you cannot sell them in the neighboring county, without the consent of the owner of the patent for that county.

J. C., of C. W.—The power of steam engine required for propelling your yacht, at a certain speed, depends upon the model and displacement. You should consult a steamboat builder, and submit your model or draft to him.

C. W. C. S., of Manassas Junction, Va.—We have seen several statements pretending to give the horse power of Niagara Falls, but we distrust them all. There is no space of any consequence, for a long distance below the falls, for building factories, or Niagara would be a splendid situation for a manufacturing city. The precipitous rocks extend nearly to the edge of the river below the falls.

A. T. S., of Ill.—You will obtain all the receipts you request some time during the publication of this volume of the SCIENTIFIC AMERICAN, as we shall publish one column of such every week.

C. M., of Pa.—You can ascertain all about vessels sailing from this port by referring to the columns of the *Journal of Commerce.*

I. M. S., of N. Y.—The article to which you refer an carbonic oxide, was obtained chiefly from the *London Journal of Gas Lighting.* The reference to water gas on the continent of Europe cannot mislead the public, as we view the question.

W. B. S., of Vt.—It is impossible to tell whether American watches keep as good time as English lever watches having the fusee, without a series of long and comparative experiments with the best watches of the two classes. So far as we know, such experiments have not been made.

C. S. H., of N. Y.—By raising a cut iron nail to a red heat, then allowing it to cool very slowly in warm sand, ashes or charcoal, it will become soft and tough and may be clinched.

R. R., of Ill.—Raw silk is not cultivated in this section, and we do not know what prices may be obtained for cocoons, or where you can obtain silk worms.

A. M. B., of N. Y.—We have never heard it stated that the stripes of the American flag were symbolic of any institution in our Republic.

P. A. J., of N. Y.—Strong and warm soap suds should remove gum from the journals of your Buck-eye mower. A lye of soda or potash will effect the same object.

J. J. A., of Wis.—Soap mixed with arsenic is the composition used for stuffing birds and preserving their skins. The following is a good receipt for your use : Camphor 2½ oz.; powdered arsenic, 1 lb.; white soap, 1 lb.; salts of tartar, 6 oz.; powdered chalk, 2 oz.; mix all together and use in the common way. Corrosive sublimate has been recommended as a substitute for arsenic in preserving insects and birds, but it is much inferior. There is no good work published on the art of forging.

W. F. S., of Ohio.—You ask for an impossible receipt, namely, "To kill the stick of glue without injuring the sticking qualities."

J. B., of N. Y.—The *London Journal of Gas Lighting* is published by W. B. King, No. 11 Bolt Court, Fleet street, London.

SPECIAL NOTICE—FOREIGN PATENT.—The population of Great Britain, is 30,000,000; of France, 35,000,000 ; Belgium, 5,000,000, Austria, 40,000,000; Prussia, 20,000,000; and Russia, 60,000,000. Patents may be secured by American citizens in all of these countries. Now is the time, while business is dull at home, to take advantage of these immense foreign fields. Mechanical improvements of all kinds are always in demand in Europe. There will never be a better time than the present to take patents abroad. We have reliable business connections with the principal capitals of Europe. Nearly all of the patents secured in foreign countries by Americans are obtained through our agency. Address Munn & Co., 37 Park row, New York. Circulars about foreign patents furnished free.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, July 2, 1862:—

C. & L., of N. Y., $15; L. E. P., of Wis, $15; O. C. S., of Mass., $75; E. E., of Cal., $10; J. J. E., of N. Y., $55; R. H., of Ill., $10; H. N. G., of N. Y., $15; C. M. B., of Mass., $15; A. B., of Conn., $225; J. H. & E. H. A., of Md., $28; C. B., of Iowa, $25; A. J. H., of Pa., $10; W. H. G , of N. Y., $40; J. H., of Pa., $20; J. R. & J. A. S., of Ill., $20; W. H. McN., of N. Y., $20; S. J. A., of Cal., $20; E. B R., N. J., of $20; M. G., of Pa., $20; L. W., of N. Y., $20; S. B. R., of Wis., $20; S. T. W. P., of N. Y., $20; G. H. M., of Mass., $20; F. W., of Mass., $45; C. & G. M. W., of N. Y., $20; G. J. H., of Ill , $20; B. & R., of Wis., $20; S. H., of Pa., $20; W. S. M., of Md., $20; G. N. C., of Conn., $20; A. J. L. of Pa., $20; J. E., of N. J., $20; J. A., Jr., of Ill., $20; G. P. B., of Pa., $20; G. & H., of Ill., $10; G. H. H., of N. Y., $40; L. H. D., of Ohio, $25; R. H. J., of Ill., $20; A. R., of Cal., $50; B. S., of N. J., $25; W. T., of Wis., $15; C. J., of Conn., $15; M. & A., of Wis., $63; D. & K., of Conn., $15; W. M. C., of Pa., $15; J. A., of Conn., $15; D. H., of Ill., $15; J. C., Jr., of N. Y., $10; L. T., of Vt., $15; F. J. R., of Pa., $15; C. & G., of Ohio, $15; M. H. S., of Ohio, $15; W. B., of Pa., $10; J. C., of Mass., $25; R. K., of Mass., $25; W. S., of N. Y., $10; J. W. S., of N. Y., $15; E. C. P., of N. Y., $15; W. K., of N. Y., $15; S. & B., of Ind., $30; S. & C., of Mass., $15; C. S., of Ill., $15; H. W., of Pa., $15; P. E. C. B., of N. Y., $10; E. P. H., of Ind., $15; T. S. S., of N. Y., $15; H. H. C., of Mich., $15; G. U., of Mass., $10; C. H. D., of Vt., $15; A. D., of Pa., $25; L. & P. K. D., of N. Y., $25; U., R., & B., of Mich., $15; G. H., of N. Y., $25; A. S., of N. Y., $25.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from June 25 to Wednesday, July 2, 1862:—

R. K., of Mass., J. C., of Mich.; J. H., of N. J.; H. P. B., of N. Y.; R. H., Jr., of Ill.; A. R., of Cal.; L. H. D., of Iowa; B. S., of N. J.; G. H. H., of N. Y.; W. H. F., of Mass.; J. C., Jr., of N. Y.; F. & A., of N. Y.; A. B. S., of Mass.; J. J. E., of N. Y.; C. B., of Iowa; A. S. L., of N. Y.; A. D., of Pa.; A. & S., of Pa.; J. H. & E. H. A., of Md.; G. H., of N. Y.

TO OUR READERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given ; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our recention of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
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INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars, address—

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MICROSCOPES.—B. H. HORN, NO. 212 BROADWAY, New York City, has compound microscopes for $2 50 each. The object glass of these has a focal length of about one inch. He has others, with two additional object glasses at $3 50 and $4. They are sufficiently powerful for showing infusoria. Address as above. 1*

THE INDUSTRIAL CHEMIST.—EDITED BY PROFESSOR DUSSAUCE. Published by JOHN HILLYER, No 219 Pearl street, New York City. One dollar and fifty cents per annum. For the chemist, manufacturer, mechanic, farmer, merchant, nd industrial in general, the INDUSTRIAL CHEMIST will be found to be a most useful and valuable paper. 1*

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TO PHOTOGRAPHERS.—IMPROVED PHOTOGRAHIC Camera, Patented March 25, 1862, by A. B. WILSON (Patentee of the Wheeler and Wilson Sewing Machine), adapted to all photographic work ; such as Landscapes, Stereoscopic Views, Carte Visites, Ambrotypes, &c. Can be used by amateurs and others from printed directions. Send for a circular. Address A. B. WILSON, Waterbury, Conn. 1tf

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FOR SALE.—THE PATENT RIGHT FOR COX'S Rotary Engine and Force Pump, illustrated and described in the SCIENTIFIC AMERICAN of April 26, 1862. Address KENYON & THEODORE COX, No. 22 William street, New York City. 1 4*

BURDON, HUBBARD & CO. MACHINISTS.—MANUfacturers of Steam Engines, Sugar Mills, Saw and Grist Mills, Boilers, Hydraulic Presses, Pumps and Gearing for working mines, &c. &c. No. 102 Front street, Brooklyn, N. Y. 1 13

QUARTZ MILLS OF THE MOST APPROVED KIND. Manufactured by BURDON, HUBBARD & CO., 102 Front street, Brooklyn, N. Y. Also agents and manufacturers of the Russ Patent Premium Amalgamators, the best and simplest in use for saving both fine and course gold. 1 13

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FOR SALE.—THE RIGHT TO BUILD CALORIC ENgines, patented and doing duty. Apply Box 508, Middletown, Conn. 1 2*

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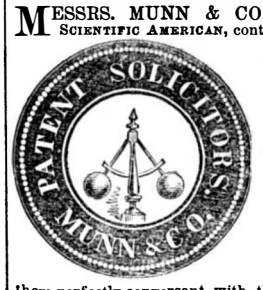
MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Courts Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, extending over a period of sixteen years, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, or sending a model or drawing and description to this office.



Consultation may be had with the firm between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Offices are cordially invited to call at their office.

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A pamphlet of information concerning the proper course to be pursued in obtaining Patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office, or either of the Branches. They also furnish a Circular of information about Foreign Patents.

The annexed letters from former Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents :—

MESSRS. MUNN & CO. :—I take pleasure in stating that while I held the office of Commissioner of Patents MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly, CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the subjoined very grateful testimonial:—

MESSRS. MUNN & CO. :—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy marked ability, and uncompromising fidelity in performing your professional engagements. Very respectfully,
Your obedient servant, J. HOLT.

MESSRS. MUNN & CO.—*Gentlemen:* It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your Agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, WM. D. BISHOP.

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AMESSIEURS LES INVENTEURS—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise e qui préféreraient nous communiquer leurs inventions en Frangais, peuvent nous addresser dans leur languenataile. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,
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Postmark-Preserving Envelope.

It is frequently important in settling questions in law to determine the date on which a letter or document was deposited in the mails, and before the introduction of envelopes the date was always preserved by the postmark being stamped upon the letter. But since the custom of using envelopes has become so universal the postmark is thrown away with the envelope, unless, indeed, pains be taken to preserve the envelope with the letter, and even in this case there can be no absolute certainty that the envelope is the same that came around the letter or document.

Some time since L. W. Leeds, of this city, conceived the idea of cutting a hole in the envelope to show a portion of the surface of the letter inside, upon which the postmark might be stamped through the hole. On applying for a patent through the Scientific American Patent Agency, it was found that the very same plan had already been patented by Benjamin Morrison, of Philadelphia, and Messrs. Leeds & Franklin then purchased Morrison's patent, which is here illustrated.

MORRISON'S POSTMARK-PRESERVING ENVELOPE.

The engraving represents an envelope prepared in accordance with this plan. The hole is cut by a stamp, and may be of any form which fancy may suggest. That preferred by the inventor is an oval, crossed by bars at right angles in the form of a cross. The postage stamp is pasted upon the cross, adhering to both the letter and the envelope, and then the postmark is stamped over all, partly upon the envelope and partly on the letter.

By this arrangement, besides the preservation of a record of the date and place of mailing, the letter and envelope are fastened together, preventing the letter from being opened or abstracted, or a false envelope from being substituted for the genuine. The defacement of the stamp is also rendered certain by the opening of the letter.

The patent for this invention was granted June 19, 1860, and further information in relation to it may be obtained by addressing Leeds & Franklin, at 112 Broadway, New York city.

Tea Brands and their Meaning.

The following will interest housekeepers :—"Hyson" means "before the rains," or "flourishing spring," that is, early in the spring ; hence it is often called "Young Hyson." "Hyson skin" is composed of the refuse of other kinds, the native term for which is "tea skins." Refuse of still coarser descriptions containing many stems, is called "tea bones." "Bohea" is the name of the hills in the region where it is collected. "Pekoe" or "Pecco" means "white hairs," the down of tender leaves. "Powchong," "folded plant." "Souchong," "small plant." "Twankay" is the name of a small river in the region where it is bought. "Congo" is from a term signifying "labor," from the care required in its preparation.

About 240 tuns of iron ore are raised daily for shipment at the Jackson Mine, Marquette, Lake Superior.

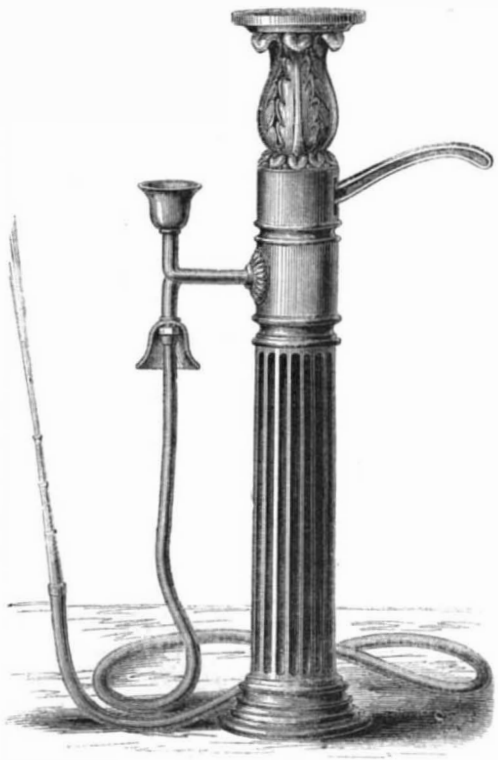
Edward Harris, manufacturer of fine woolens, at Woonsocket, R. I., is about erecting a new mill for the prosecution and enlargement of his business.

Selling Articles at Industrial Fairs.

At exhibitions of machinery and agricultural fairs, a rule is sometimes adopted by which managers prohibit exhibitors from selling articles on the grounds. We hope this rule will not be adopted at a single fair this year. It is unwise and unjust in some of its features. It is for the mutual advantage of exhibitors and visitors at fairs, that there should be a free exchange and sale of commodities allowed. Persons who visit fairs see articles which they want and desire to possess, and those who exhibit are in the same frame of mind to part with or sell their articles. Private sales are not forbidden ; we do not allude to these, but to public sales and delivery on the grounds. It would be well, therefore, to set one or two days apart at the close of every fair for public sales and delivery.

INGLIS'S CUP ATTACHMENT FOR HYDRANTS.

It is well known that when cups are attached to hydrants by chains they are very liable to be detached and carried away, but the annexed cut represents a plan for attaching a cup which renders it perfectly secure, and sure to remain as long as it lasts.



The cup is formed on the end of the nozzle, the pipe being fitted to turn with a water-tight joint, so that in drawing water into a pail the end of the nozzle may be turned down. The pipe rises a little within the cup and has a screw upon its end to receive a hose.

Steps have been taken through the Scientific American Patent Agency to procure a patent for this invention, and further information in relation to it may be obtained by addressing the inventor, Samuel Inglis, at the office of the *Chronicle*, Pittsburgh, Pa.

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The SCIENTIFIC AMERICAN is indispensable to every inventor, as it not only contains illustrated descriptions of nearly all the best inventions as they come, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week, the best scientific journals of Great Britain, France and Germany; thus placing in our possession all that is transpiring in mechanical science and art in these old countries. We shall continue to transfer to our columns copious extracts from these journals of whatever we may deem of interest to our readers.

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WAR! WAR! WAR!

Our summary of the war news, which has been so highly complimented by our readers and cotemporaries, will be continued in the coming volume so long as the war lasts, accompanied with copious illustrations of new war implements of various kinds, such as cannon, firearms, projectiles, &c., &c.

TO ALL WHO CAN READ!

Everyone who can read the English language, we believe, will be benefited by subscribing for the Scientific American, and receiving its weekly visits; and while we depend upon all our old patrons renewing their subscriptions, we would ask of each to send us one or more new names with his own. A single person has sent us as many as a hundred mail subscribers, from one place, in a single year! The publishers do not expect every one will do as much; but if the five thousand subscribers, whose subscriptions expire with the present volume, will each send a single name with their own, they will confer a lasting obligation upon us, and they shall be rewarded for it in the improvement we shall be enabled to make in the paper by thus increasing our receipts. The following are the

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FROM THE STEAM PRESS OF JOHN A. GRAY

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